THE IRON TRADE REVIEW

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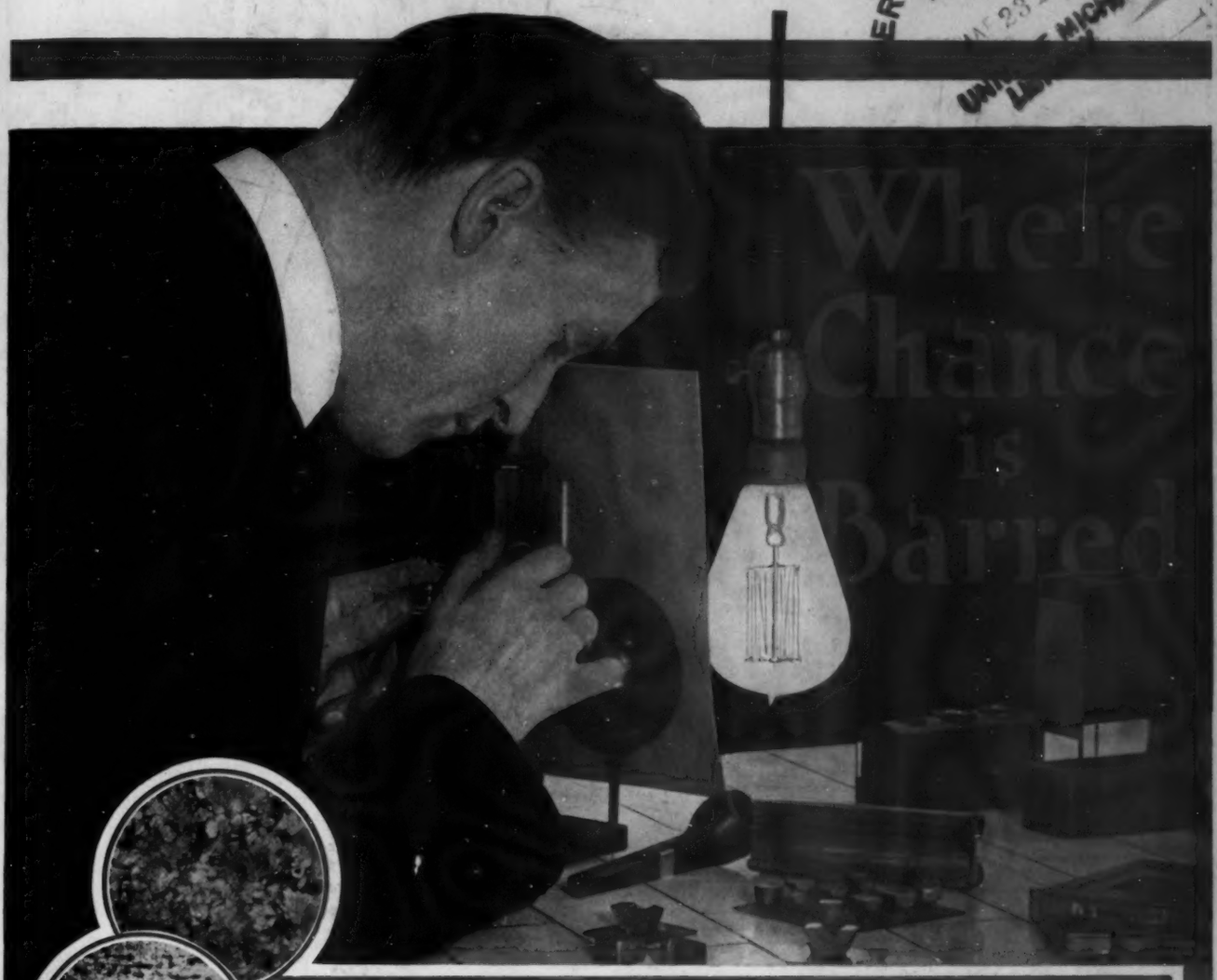

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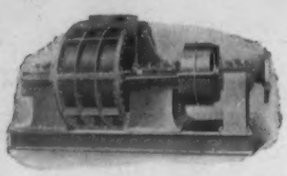

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THE IRON TRADE REVIEW

Vol. LVIII Cleveland, March 23, 1916 *No. 12*

Domestic Demand is Increasing

And Foreign Business is Not Being Sought—Very Heavy Orders for Rails, Steel for Boats, and Other Finished Products

INDUSTRIAL conditions are not as sensitive to rumor as is the stock exchange and reports of the possibility of European belligerents coming to an agreement on peace terms, have not had any appreciable effect on iron and steel products, except that consumers of ferro-manganese are showing some hesitation in placing orders at $175 per ton for delivery after July 1. Sales of this alloy, amounting to 10,000 tons, have been made, however, during the past few days at $175, and as high as $400 is sometimes paid for prompt delivery. The action of the English government in taking over for its own use manganese ore deposits in India indicates an even more stringent policy for the future. The domestic demand for steel has increased so heavily that export business is not as important a factor, and some large sellers, while taking the regular export orders which come to them, are making no effort to extend the foreign trade. Orders for steel for boats, amounting to 200,000 tons additional, for the first half of next year, were placed with large makers at 2.50c, Pittsburgh, for shapes and 2.90c for plates. Steel for cars for delivery late this year has been order at 2.35c for shapes and 2.75c for plates. The Standard Oil Co. has placed orders for two more boats for the Pacific coast.

Pig Iron

Consumers of pig iron, especially those in the Philadelphia and Pittsburgh districts, are coming into the market more freely to cover for their requirements for the first half of next year, and some sales have been made at prices slightly higher than those prevailing for the remainder of this year. These transactions include 1,000 tons of No. 2 foundry at $20, valley, taken by a manufacturer of heavy rolling mill equipment in the Pittsburgh district, and 5,000 tons of malleable at $19.25, valley. The Allegheny Steel Co. has taken 18,000 tons of basic for delivery during the last six months of this year, and sales involving large amounts have been made in the Pittsburgh district without the details being made public. A Detroit steel-casting concern has entered the Pittsburgh market for 5,000 tons of basic and the Marshall Foundry Co., Pittsburgh, is negotiating for 20,000 tons of bessemer for shipment over the last half of the year. Sales of bessemer have been made at $21.50, valley, and $18.75, valley, seems to be the minimum on No. 2 foundry.

Rail Buying

Buying of steel rails for 1917 delivery is very active, among the latest tonnages booked being 75,000 tons for the Baltimore & Ohio, 20,000 tons for the Burlington, and 40,000 tons for the Chicago & Northwestern. The Pennsylvania has opened negotiations for rails and will probably close at an early date. Inquiry for cars continues active. The Pennsylvania railroad is understood to be considering the purchase of 18,000 to 20,000 cars. Some car buying for 1917 delivery is now being done. It is authoritatively announced that there will be no advance in the price of rails.

Billets

The scarcity of semi-finished steel has resulted in some extraordinary prices being paid. In the east, open hearth rolling billets are being held at from $50 to $55, and forging billets at $65 to $75. In the Pittsburgh district, it is difficult to determine prices with accuracy, but $45 seems to be the minimum on billets and sheet bars. With bessemer pig iron selling at about $21, the spread between billets and pig iron is unprecedented.

Plates

The trend of prices of plates is still upward, and while 2.60c was recorded as the minimum last week, it is doubtful whether any plates are now obtainable at less than 2.75c, and for prompt delivery, much higher prices are paid. Cleveland mills find no difficulty in obtaining 3.50c for fairly early delivery and higher prices are paid in the east. Three ship building concerns in the Philadelphia district are inquiring for from 15,000 to 20,000 tons of steel for six vessels on which they are figuring.

THE OPEN HEARTH

Results of Industrial Preparedness

ALMOST impressive demonstration of splendid results of industrial preparedness is furnished by the fourteenth annual report of the United States Steel Corporation. During the profound depression of 1914, a large amount of money was expended in making repairs and improvements. This was done because it was believed to be sound business policy and in harmony with the instructions of Judge Gary to the presidents of the subsidiary companies, to give employment to as many men as possible in making repairs. Hence when business began to improve rapidly in 1915, the plants were ready to do their work, the production was greatly increased and there was a corresponding increase in earnings.

The wonderful change did not start until the second quarter, when the earnings, before charging interest on bonds and mortgages of subsidiary companies, were $30,536,467, a gain of $7,580,053 over the same period in 1914. The third quarter showed a gain of $16,257,828, and the fourth quarter a gain of $40,034,285 compared with the same quarters of 1914. There is a striking contrast in the earnings of the December quarter of 1914, which were the lowest in the entire history of the Corporation, while those for the last quarter of 1915 were the largest in its history.

The figures of production did not make a new record in 1915, owing to the slow pace of the first part of the year. The figures of steel ingot production for the past four years were as follows: 1912, 16,901,223 tons; 1913, 16,656,361 tons; 1914, 11,826,476 tons; 1915, 16,376,492 tons.

The report as to employes indicates that the number is not as large in proportion to production as in 1912 and 1913. The figures for the past four years have been as follows: 1912, 221,025; 1913, 228,906; 1914, 179,353; 1915, 191,126. One of the most gratifying features relating to employes is the showing of continued reduction of the number of accidents. Fatal accidents in 1915 were 15.38 per cent less than in 1914 and 59.27 per cent less than in 1906. Of course it was not to be expected that there would be as large a percentage of reduction in accidents last year as there was in years following 1906, for the reason that following the first vigorous and systematic efforts to prevent accidents, there was a sharp reduction in the number and this rate of reduction could not continue indefinitely. On the basis of an annual pay roll equal to that for 1915, advances in wages made Feb. 1 of this year will call for an increased disbursement of about $14,000,000 per annum.

That the remarkable increase in earnings is due very largely to the development of export business is clearly shown. Domestic shipments of all kinds of materials except cement, show an increase of only 13.1 per cent compared with 1914, while export shipments increased 112.4 per cent. While the prices on domestic shipments advanced only 26 cents per ton as compared with 1914, the advance in export business was $4.19 per ton. Price advances since Jan. 1 on domsetic business would show a much larger amount than for the year 1915. Profits for the present quarter will be considerably larger than for the fourth quarter of 1915, and the present outlook is that no quarter this year will fall behind the first three months.

Turning to the reports of two of the great independent companies, made public during the past few days, those of the Bethlehem Steel Corporation and the Cambria Steel Co., the fact that the prosperity of the Steel Corporation is entirely in harmony with the prosperity of its competitors is emphasized anew. The earnings of these competitors, indeed, show a much larger percentage of increase than do those of the Steel Corporation. The net income of the Cambria Steel Co. for 1915 was $6,403,538, compared with only $1,960,990 in 1914 and $6,234,950 in 1913. The net income of the Bethlehem Steel Corporation was $17,762,812, compared with $5,590,020 in 1914. A very interesting comment on government policy is found in the fact that the only department of the Bethlehem Steel Corporation not running at full capacity is the armor plate department. Manifestly, preparedness has become real with the great industries of the country, but not with the government. While the armor plate plant lies idle, senators land another blow on private industry by voting for the establishment of a government armor plate plant.

Agitators and the East Youngstown Riot

AMONG the telegrams of congratulation received by Prosecuting Attorney Henderson, after the reporting of the indictment of Judge Gary and certain steel companies in the Youngstown district, was the following:

Please accept the heartiest congratulations of the committee on industrial relations on the course you have pursued in so directing the investigation of the East Youngstown riot that the effort has been made to get below the surface and to find the fundamental causes. Your recognition of the paramount part that is played in instigating such riots by economic and industrial conditions is a departure of the greatest importance, indicating as it does the more enlightened view is coming to be held of what justice demands in such cases. Heretofore, the unfortunate victims of criminal economic conditions have been held to answer, while no effort has been made to punish those responsible for the maintenance of these conditions. Without

THE OPEN HEARTH

attempting to pass on the guilt or innocence of the defendants, we believe you have broken ground for a future administration of the law that will make for greater justice. Just insofar as your splendid example is followed by other public prosecutors will the administration of justice in the United States regain the confidence and support of that great number of citizens who now suspect and distrust it.

DANTE BARTON — HELEN MAROT
AMOS PINCHOT — JOHN P. WHITE
FRANK B. WALSH — AGNES NESTOR
JOHN B. LENNON — FREDERIC C. HOWE
JAMES O'CONNELL — RT. REV. C. D. WILLIAMS,
JOHN FITZPATRICK
Committee on Industrial Relations.

The records of Frank B. Walsh, former chairman of the commission on industrial relations, and of several other members of the self-constituted committee, were such that it was not at all surprising to find their signatures attached to the above telegram. They have been such notorious mischiefmakers that they would delight in patting on the back a prosecutor who has followed the course recently adopted by Henderson. Of some other members of the committee, we had little or no information, but it was difficult to believe that a man holding the exalted position of bishop of the Episcopal church of Michigan would sign his name to such a document. Hence the following telegram was sent:

RT. REV. C. D. WILLIAMS, *Bishop of Michigan,*
Detroit, Mich.

Did you authorize the signing of your name to telegram of congratulation to Prosecutor Henderson on indictment of Judge Gary and others at Youngstown? Please answer, our expense.
The Iron Trade Review.

Bishop Williams replied as follows:

EDITOR, *The Iron Trade Review*:—

Telegram committee sent expressly eliminated personalities. It commended prosecutor for going beneath superficial symptoms of the riot into economic causes in the form of intolerable conditions and wages that did not assure decent living. By that statement, I stand heartily. CHAS. D. WILLIAMS...

The bishop's reply is a striking illustration of how a man of great ability and the best motives will allow himself to be controlled by his sympathies and deceived by his associates. If one were to believe the above telegrams, he would conclude that this young prosecutor at Youngstown suddenly had made a wonderful discovery in uncovering the fact that all the causes of a riot do not appear on the surface. Of course, they do not. There is always more or less underlying dissatisfaction which is a factor in an industrial disturbance. The "paramount part" in the dissatisfaction at East Youngstown was the agitation which had been carried on by certain labor union leaders who were determined to bring about the establishment of the closed shop, and, since the riot, representatives of the committee on industrial relations have done their utmost to keep up and increase dissatisfaction and ill will existing in Mahoning county. Judge Gary was absolutely blameless, and the companies indicted had an admirable record for the fair and even generous treatment of their employers. If there were any "criminal economic conditions", they were not brought about by Judge Gary and the indicted companies.

Unfortunately the administration of justice in the United States is suspected and mistrusted to a considerable extent, but it is largely on account of just such actions as that of the prosecuting attorney of Mahoning county. The indictment of prominent men has become so frequent that often it is not taken seriously, and in the case of the indictment of Judge Gary, many people are disposed to treat the matter lightly. We believe, however, that it is a very serious matter and should be so considered and that all connected with it in any way, including sociologists of good and bad motives, should be held to a strict accountability for the part they play.

But even the most serious matters often present amusing features and the really laughable contribution in this case is made by Samuel Gompers, president of the American Federation of Labor, although that gentleman probably is not conscious of furnishing anything amusing. The indictment against Judge Gary and certain companies charges that they "did unlawfully agree, combine, conspire and confederate for the purposes of creating and carrying out restrictions in trade, business and commerce" in the "manufacture, making, sale and purchase of certain merchandise, products and commodities, to-wit—iron, steel and common or unskilled labor, etc." Gompers sees what the position taken by the Mahoning county prosecutor would lead to, for it certainly would make possible the indictment of labor unions and labor union agitators for engaging in a conspiracy to control the labor market. Hence Gompers points out that the labor unions have always insisted that labor is not a commodity and that their contention was enacted into law in the declaration contained in section six of the Clayton anti-trust law. So, lo and behold, we find this prosecutor, who, according to Bishop Williams and his associates, has made a wonderful discovery as to underlying causes of industrial troubles, has also unwittingly delivered a deadly thrust at the labor unions. Union labor in Mahoning county is said to have lined up with Gompers. The question is—what will it do with its dear friend, the prosecutor?

Prices Present and Past

Quotations on leading products March 22, average for February, 1916, average for December, 1915, and average for March, 1915. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Mar. 22, 1916.	Aver. for Feb., 1916.	Average for Dec., 1915.	Aver. for Mar., 1915.
Bessemer pig iron, Pittsburgh	$21.95	$21.45	$19.85	$14.55
Basic pig iron, Pittsburgh	19.45	18.77	18.55	13.45
No. 2 Fdy. pig iron, Pittsburgh	19.70	19.51	18.85	13.80
Northern No. 2 Fdy., Chgo	19.00	18.50	18.10	13.00
Lake Superior Charcoal, Chgo	19.75	19.50	19.15	15.75
Mall. Bess., Chgo	19.50	19.00	18.10	13.00
Southern No. 2, Birmingham	15.50	15.25	14.13	9.38
Southern Ohio No. 2, Ironton	18.50	18.00	17.00	12.75
Basic, eastern Pa	20.00	19.50	18.00	14.00
No. 2X Virginia furnace	18.50	18.00	17.00	12.50
No. 2X foundry, Philadelphia	20.00	20.00	19.25	14.25
Ferro mang., Balti., (forward)	175.00	140.00	100.00	100.00
Bessemer billets, Pbgh	45.00	34.00	29.60	19.50
Bess. sheet bars, Pbgh	45.00	34.00	30.80	20.00
Op.-h'th sh. bars, Pbgh	45.00	35.00	30.80	20.00
Open-hearth billets, Pbgh	45.00	35.00	30.20	19.50
Steel bars, Chgo	3.10	2.23	1.97	1.34
Steel bars, Pittsburgh, contr	2.45	2.01	1.74	1.15
Iron bars, Philadelphia	2.559	2.409	1.959	1.15
Iron bars, Cleveland, local del'y.	2.40	2.29	1.75	1.15
Iron bars, Chgo. mill	$2.25	$1.91	$1.70	$1.10
Beams, Chgo.	3.10	2.22	1.97	1.34
Beams, Pittsburgh, contr	2.45	2.03	1.74	1.15
Beams, Philadelphia	2.659	2.259	1.959	1.25
Tank plates, Pbgh., contract	2.75	2.13	1.74	1.125
Tank plates, Chicago	3.50	2.33	1.97	1.34
Tank plates, Philadelphia	3.409c	2.709	1.959	1.25
Sheets, blk., No. 28, Pbgh	2.90	2.60	2.54	1.80
Sheets, blue an., No. 10, Pbgh.	3.00	2.61	2.23	1.30
Sh., galv., No. 28, Pbgh	5.00	4.75	4.25	3.40
Wire nails, Pittsburgh	2.40	2.22	2.02	1.60
Connellsville fur. coke, contr	3.00	2.50	2.35	1.65
Connellsville fdy. coke, contr	3.50	3.75	3.00	2.25
Heavy melting steel, Pbgh	18.50	17.37	17.40	12.00
Heavy melting steel, east'n Pa	18.00	16.50	16.00	11.00
Heavy melting steel, Chgo	16.50	15.25	15.40	9.75
No. 1 wrought eastern Pa	23.00	22.50	20.00	12.50
No. 1 wrought, Chgo	16.25	14.93	15.15	9.00
Rerolling rails, Chgo	18.00	17.12	16.70	10.00
Car wheels, Chgo	14.25	14.06	14.75	10.00

(For Additional Prices See Page 678.)

Buying Pig Iron for Next Year

Many Consumers at Pittsburgh Anxious to Cover for First Half of 1917—Demand More Active in the East

Pittsburgh, March 21.—Many consumers in the Greater Pittsburgh district have entered the market for pig iron requirements for the first half of 1917 and some iron for that shipment has been sold at prices slightly above those prevailing for delivery the remainder of this year. A manufacturer of heavy rolling mill equipment has taken 1,000 tons of No. 2 foundry at $20, valley, and a malleable casting maker has purchased 5,000 tons of malleable iron at $19.25, valley, for shipment the first and second quarters of next year. Indications are that considerable iron for 1917 shipment will be sold before April 1.

The Allegheny Steel Co. has taken 18,000 tons of standard basic iron for delivery the second half of this year at prices equivalent to $18.50, valley. The iron involved will be furnished in equal portions by two blast furnace plants in western Pennsylvania, the freight rates from which are slightly less than that from the valleys, 95 cents a ton. A Detroit steel casting maker has entered this market for 5,000 tons of basic iron for second half delivery, apparently not being able to cover requirements in Michigan. The Marshall Foundry Co., Pittsburgh, is negotiating for 20,000 tons of bessemer iron for shipment the last half of the year. Bessemer is firmly held at $21, valley. Reports that the Cambria Steel Co., Johnstown, Pa., had closed for a heavy tonnage of bessemer iron, are officially denied. A local foundry has purchased 7,100 tons of foundry iron, paying $19, valley, for No. 2 for shipment the third and fourth quarters of the year. Another foundry interest has closed for 500 tons of No. 2 foundry at $18.75, Valley. The Union Switch & Signal Co., Swissvale, has bought from between 5,000 to 6,000 tons of foundry and malleable grades for shipment the second, third and fourth quarters, at current prices. Several sellers are asking $19, valley, for No. 2 foundry, malleable and basic iron and $21.50, valley, for bessemer.

Rebecca furnace of the Kittanning Iron & Steel Mfg. Co., Kittanning, Pa., now running on ferro-manganese for the Jones & Laughlin Steel Co., will go out of blast for relining before July 1, after which time it will be operated by the owners, who expect to make basic iron.

Compared with records made by most finished products, the advance in price made by pig iron the last 12 months, is not sharp. Bessemer pig iron has advanced $6.90 and basic $6 a ton during the last year.

(For complete prices see page 678.)

Valley Market Firm

Youngstown, March 21.—Pig iron makers in this district have not been approached by consumers anxious to cover 1917 requirements. Some producers express unwillingness to close for business at that advanced delivery. Orders now on the books place makers in a comfortable position and with iron moving freely, a firmer tendency is evident. The $18.50 minimum on No. 2 foundry has been withdrawn by most valley makers, who are holding for $19. Other producers who are generally well sold ahead are asking $21.50 for bessemer grades.

Sales of 4,000 Tons

Cleveland, March 21.—Only moderate sales are being made in the immediate Cleveland district and there are few inquiries for prompt delivery. Sales agencies report, however, a continuation of the active demand outside of the Cleveland district and they have made sales amounting to fully 40,000 tons during the past week. For No. 2 foundry, $18.75, valley, is now the prevailing rate and several sales of bessemer have been made at

$21.50, valley. The minimum on malleable is still $18.50, valley.

Broadening Demand

New York, March 21.—Sales and inquiries for iron have continued to broaden steadily and the market is quite active in this territory. Bookings of the past week in the immediate district have totaled perhaps 25,000 to 30,000 tons. A Branford, Conn., buyer took 6,000 tons of malleable for last half for a New York state maker at above $18, Buffalo basis. The Chrome, N. J., steelmaker took about 4,000 tons of low phosphorus additional, completing an 8,000-ton inquiry for last half. A New Jersey steelmaker is understood to have closed for 1,500 tons of bessemer and another steel works in the same territory wants 1,000 tons of prompt bessemer. A Peekskill buyer took 1,000 tons of foundry; a Connecticut shop, 1,000 tons and there have been several 500-ton lots placed by New Jersey melters near tidewater. A New York state shop is inquiring for 2,000 tons of malleable; a Newark, N. J., soil pipemaker 2,000 to 3,000 tons of No. 2 plain and No. 2X; an Elizabeth, N. J., user for 900 tons of No. 1X and No. 3; two Connecticut shops for 600 tons each and three or four 500-ton lots for Jersey delivery. A 1,200-ton malleable inquiry for Elizabeth also is reported. Prices have continued around $20.25 to $20.75, tidewater, for No. 2X. A sale of eastern Pennsylvania No. 3 at $20.34, delivered in the tidewater zone, was made this week, but there are also reports of No. 2X sales at $20.30, delivered. A Buffalo maker is offering a price of $19, furnace, for No. 2X for the first half of next year. An inquiry for 7,000 tons of foundry iron for Spain came out this week; also a 50,000-ton bessemer proposition for export, which bears evidence of being genuine. This iron is to be shipped the balance of the year and the destination is not given.

Buying for Next Year

Philadelphia, March 20.—Some important buyers of pig iron are showing a further willingness to close for metal for delivery in 1917 at prevailing or advanced prices. Where they are doing so, they usually have made sales of their own product for delivery past Jan. 1, 1917, and apparently are unwilling to leave uncovered their requirements of iron to fill these orders. A leading eastern consumer of low phosphorus iron has closed for upwards of 5,000 tons of standard metal for the first half of next year at $30, furnace, or on the basis of $32.62, delivered in the Philadelphia zone. Other inquiries for this grade for the same delivery now are before makers. As recently noted, a Trenton, N. J., steelmaker has bought basic for 1917 delivery, and there is a report that an eastern Pennsylvania steel works has closed for some basic for next year to cover structural shape sales. Some further good-sized sales of low phosphorus iron for delivery this year have been made. A Chrome, N. J., steelmaker who bought 4,000 tons a week ago has purchased about 4,000 tons from another maker and now has filled its needs. A recent sale of 4,000 tons of Lebanon iron for last half was to an Easton, Pa., consumer. Lebanon low phosphorus recently has been sold as low as $28 and as high as $32, furnace. The largest maker there, because of a change in ownership, is selling sparingly. Makers of standard iron hold from $30 to $31, furnace. An eastern producer of 0.04 phosphorus iron is asking $29, furnace. Iron of 0.05 and 0.06 quality recently has been sold at around $26, eastern Pennsylvania furnace. An inquiry from an export company is in the basic market for 21,000 tons for April-August delivery, but it is understood the metal is for a Delaware steel works about to begin operations. Some eastern basic makers have some unsold tonnage for first half and probably would sell without an advance, or around $19.75, delivered. Foundry iron business remains sporadic and the tonnage is not heavy. A Baltimore consumer took 1,000 tons. A Trenton manufacturer of sanitary ware wants 5,500 to 6,000 tons of 2.25 to 2.50 and 3.25 to 3.50 silicon iron for the rest of the year. Eastern Pennsylvania foundry irons range generally from $19.50 to $20, furnace, for No. 2X, with one maker asking $21. No. 2 plain has been sold at $20, furnace, but no No. 2X at $21 yet. The Virginia Iron, Coal & Coke Co. has advanced 50 cents for first or second half to $18.50, furnace, for No. 2X, or 2.50 to 3 per cent silicon basis, and for fourth quarter exclusively $1 to $19, furnace. For 2.25 to 2.75 silicon it quoted $18.25 for third quarter or last half and $18.75 for fourth quarter alone. This maker is sold up for the second quarter.

Virginia Iron Up

Cincinnati, March 21.—Pig iron inquiries from melters in this district have fallen away until they are at a lower stage at present than at any time since the first of the year. This is attributed to the fact that such a large tonnage has been sold during 1916 and late in 1915, that both productions by furnace and requirements of users are well taken care of for the entire year. Prices are very strong. Southern No. 2 foundry is unchanged at from $15 to $15.50, Birmingham basis, for the first half and from $15.50 to $16 for the second half. Silvery iron is quoted at from $26 to $27, furnace, for 8 per cent silicon. Southern Ohio furnaces are firm at $19, Ironton basis, for No. 2 foundry. Resale iron is still obtainable at $18.50. Virginia No. 2X has been advanced to $18.50, furnace, for delivery through the third quarter, and to $19, furnace, for the last quarter. The Watts furnace of the Virginia Iron, Coal & Coke Co., which blew in March 18, has withdrawn from the market. Recent sales include 1,000 tons of silvery iron in Indianapolis, 5,000 tons of charcoal iron and 7,000 tons of coke iron in Michigan, 900 tons foundry iron to Louisville & Nashville railroad. Recent inquiries include 1,000 tons of basic iron from Detroit, 900 tons of southern iron from a Pennsylvania user, and 600 tons of special iron from Chattanooga, Tenn.

(*For complete prices see page 678.*)

Buying Less Active

Chicago, March 21.—Inquiry for pig iron in this district, while still active, is somewhat less than has been the rule for the past few weeks. It seems that most large melters have covered for their requirements over last half. Some further buying is expected on the part of these consumers, but this probably will not be done for some time.

March sales promises to break all records in this district. Some sellers already have booked sufficient tonnage during this month to make a new record, and if buying continues at like activity, a new high total will result.

Northern No. 2 foundry iron is selling at $19, furnace, with malleable at $19.50, furnace, and an advance from these figures is not expected immediately under present conditions of competition. Inquiries now current are about 20,000 to 30,000 tons, for both malleable and foundry.

Some sales of malleable iron for first half of 1917 have been made at the same prices that prevail for this year's delivery. These are thought to be for the purpose of covering long contracts for castings, and foundrymen seem willing to take a chance on at least part of their requirements.

Lake Superior charcoal iron is still quoted at a range of $19.75 to $21.75, delivered, Chicago, with considerable sales being made. Charcoalmakers have considerable stocks and higher quotations probably will not be made at present.

Most makers of southern iron are quoting $15.50, Birmingham, for first half, and $15.50 to $16, Birmingham, for

second half. At least one interest is taking business at $15, Birmingham, for first half, and $15.50 for last half.

The Miami Products Co. is making contracts for spiegeleisen and manganese metal up to 50 per cent for delivery when its furnace at the Iroquois plant at South Chicago, is in blast, which will be during April. It is understood $4 per unit of manganese is being obtained.

Shipments from furnace are about equal to production in the Chicago district, and no iron is being piled. Melters are taking their full tonnage and some are asking for more than their contracts cover.

Busy in the South

Birmingham, Ala., March 21.—The volume of business transacted during the past week by the iron interests of the district was comparatively small, compared with the week previous—yet that firm tendency was present, and the position of sellers as to prices was unswerved. The producing interests, since the first of the present month, have sold considerably more iron than they have produced, which means that they have not only been busy loading from the block, but have reduced to a certain extent their stock on hand. One interest reports that it is now asking $16 for last half iron, yet other sellers have not raised their $15.50 price. Sellers have not been soliciting new business for the past two weeks—preferring to hold off and take care of their line of trade as it should come in the market. One company sold during the week 900 tons of special analysis iron at $18.50 per ton at the furnace, and 600 tons of standard iron at $15.50 per ton for last half delivery. First half inquiry for iron has practically been replaced by "spot"—for which the interests generally are asking $15 to $15.50 per ton at the furnace. The consuming interests of the district are running well up to normal, and in some instances the larger foundries are running their cupolas full time and the machine shops double shift. The foundries on lathes and special work have been exceptionally busy. The water and soil pipe interests, as well as special fittings foundries are on full time.

Inquiries Continue Heavy

Buffalo, March 21. — The demands upon furnaces for pig iron of the various grades continues strong, although the sales for the week have not measured up to the large tonnages that have been seeking placement for the past ten days or more. The furnaces of the Buffalo ditsrict, as far as they are disposed to report, have booked orders for about 15,000 tons of the various grades, for prompt deliveries where possible and for requirements extending over the remainder of the year.

Prices generally are holding very firm and the majority of the producers are disposed to stiffen their schedules, although it is believed that one interest has been shading here and there from the $19 to $20 quotations on the better grades, in order to book certain desirable tonnages for delivery over the remainder of the year. Of the reported inquiry for 30,000 tons of Bessemer, noted a week ago, seeking placement in blocks of 10,000 tons a month for the next three months, one of the Buffalo furnaces took about 1,000 tons for prompt delivery at $22, f. o. b. furnace. An order for 300 tons of foundry iron for a Newfoundland consumer, for delivery in June, via the Erie canal to tidewater, was booked by one interest at $20 at the furnace.

The choked up condition of the rail carriers to New England and other eastern markets, with the embargoes that have been in force for some time, constitute about the only troublesome factor in the way of causing a decidely increased inflow of inquiries and orders from the melters in the territory served by the roads that are being offered more traffic than they are able to handle. The range of prices for the week continues from $18.75 as a minimum on the lower grades to $20 and $21 on the higher grades, with No. 2X foundry being held generally at $19 to $19.50.

Demand for Pipe

Has Been Greatly Stimulated by Activity in the Oil Fields

Pittsburgh, March 21.—Unprecedented prices for oil have stimulated development of the oil fields in the southwest, to which heavy tonnages of oil country goods are being shipped. No large single orders for iron or steel pipe have been placed this week. Advances in the price of wrought steel and iron pipe, announced a week ago by the National Tube Co. and the A. M. Byers Co., have been adopted generally. It is likely that prices will be put up further at an early date.

Warehouse Prices Higher

Cincinnati, March 21. — Warehouse prices continue to advance. Cold rolled round bars are now given at 5 plus list price, and flat, square and hexagon at 7 plus list price. Hot rolled steel bars are quoted at from 3.20c to 3.75c, shapes at 3.20c, and plates at 3.50c. Warehouse prices on sheets are as follows: Blue annealed No. 10, 3.35c; black No. 28, 3.80c, and galvanized No. 28, 5.50c. Demand is good and is expected to increase with the opening of good weather this spring.

(*For complete prices see page* 678.)

Stores Advance Sheets

Chicago, March 21.—Warehouses have advanced prices $2 per ton on black and blue annealed sheets, bringing No 28 gage black to 3.20c, Chicago store, and No. 10 gage blue annealed to 3.25c, Chicago store. Plates, shapes and bars remain at the figures established a week ago, when $4 per ton was added to bars and shapes and $7 per ton on plates.

Ore Shipments

Will be Delayed by Cold Weather—Heavy Movement Expected

Cleveland, March 21.—The extremely cold weather of the past three weeks has been very unfavorable for the early opening of navigation. Hopes which were at one time entertained of starting boats for Escanaba before April 1, have been abandoned and it does not seem probable that navigation at the Soo will be opened before April 25. In spite of these conditions, it is believed that the vessels will have no difficulty in moving 55,000,000 tons of ore during the season, if the railroads running from lower lake ports are able to do their share. Shipments from dock at lower lake ports are heavy. The outlook is that the ore on dock May 1 will show a smaller tonnage than for a number of years.

Not a Commodity

Says Judge Foreshadowing Quashing of the Indictment.

Youngstown, March 22. (By wire.)—Judge W. S. Anderson, presiding in the common pleas court in the hearing today to quash indictments recently found against steel companies, took the position that labor is not a commodity. Judge W. H. Day, of Cleveland, presented the case for the defendants on the uncertainty of the wording of the indictments, alleging the crime charged conflicts with the Sherman act, inasmuch as the material goes beyond the boundaries of the state. Roy Manchester for the defendants, spoke on the Clayton act, which declares that labor is not a commodity. Arguments are to continue throughout most of the day.

Major Edward Harris Goodman, formerly vice president and general manager of the Pullman Co., Chicago, and of the Union Switch & Signal Co., Pittsburgh, died March 4 at Palm Beach., Fla. His home was at Gwynned Valley, near Philadelphia.

Ferro Sells Less Freely

Possibility of the War Ending by July is Factor—English Government Takes Over Indian Ore

New York, March 21.—New sales totaling about 10,000 tons of standard English ferro-manganese have been closed during the past few days for shipment over the first half of 1917 at $175, seaboard, in accordance with new authority given by the makers to their agents in this country. This permission to sell in all cases was limited to a specific tonnage. The agents found more difficulty in disposing of their quotas, and they still have a considerable tonnage unsold. Buyers seem less inclined to pay the high price of $175, seaboard, up to July 1, 1917, and evidently have in mind the possibility of the war ending by that time. This is especially true among the larger consumers who have been reluctant to close. Furthermore, the producers have inserted a new clause to the agreement of sale which qualifies the liability of the producer to make deliveries in the event of any one of a series of retarding conditions.

This new clause is as follows: "Deliveries may be suspended during any contingencies beyond control of sellers including strikes, lockouts, labor troubles, fire, war, short supplies of fuel or raw material, accidents or short supplies of tools, plant machinery or manufactured product, rise by more than 25 per cent in rates of freight from India to United Kingdom or from United Kingdom to United States of America or other causes preventing or hindering the manufacture or delivery of the article at the works or to the buyers in the United States of America."

Spot sales of 80 per cent English ferro-manganese, which continue of the small and scattered variety, are bringing around $400, seaboard. Two carload sales were made in the Pittsburgh district at that figure, while at New York there were a 10-ton and similar transactions. A 5-ton lot of ground went at $402, seaboard, at Philadelphia. Sellers of the ground product are realizing a ton-price of approximately $375 to $400 at the grinding plant. Domestic makers are reported to have made sales of 50 per cent for forward shipment at $5.20 per unit, delivered in the Youngstown district.

Very little spiegeleisen before July 1 is offered, and for last half there is good buying on the basis of $60, furnace, for 20 per cent. Some negotiations for tonnages are under way at higher figures. Plans are in view for increasing the domestic production of spiegeleisen, and several eastern furnaces are being considered in these enterprises. In addition to the Sheridan, Pa., furnace, which has been acquired by a Philadelphia dealer for the making of ferro-manganese, it is reported, another idle eastern Pennsylvania furnace has been bought or leased for similar purposes.

British to Take Indian Ore

Philadelphia, March 21.—Advices have been received in the trade here to the effect that the English government has taken over all the manganese ore in India, and there will be no further shipments to outside users except that which already has been contracted for. No more sales of Indian ore will be made until the needs of the British government are fully secured. Occasional cargoes of Indian manganese ore have been sold to consumers in this country since the war at high prices.

Manganese Ore Deposits

Pittsburgh, March 21.—Dr. Samuel M. Black and William Salisbury, of Pittsburgh; W. M. Cole, Carnegie, Pa., and C. M. Clay, of Mineral Cove, Va., who have been conducting an exploration of the mineral fields in Shenandoah county, Virginia, have received reports that a mine with a productive capacity of 60 tons of manganese ore daily, has been developed by those in charge. Permanent mining equipment will be installed at once, it is stated. According to Dr. Black, the company has secured the mineral rights of 3,000 acres of land, extending for six miles along the Blue Ridge mountains, near Mineral Cove, Va.

The product of the mine has been examined by the Gulick-Henderson Co., Pittsburgh chemist, whose report was extremely gratifying to the men interested in the project. In addition to the manganese ore, the men interested in the undertaking express hopes of recovering other valuable minerals, including yellow, dark and salmon ochres, which are said to exist in large quantities.

There was no change in the choice of directors of the Maryland Steel Co. which took place at the annual meeting of the stockholders at Baltimore on March 15. It was announced after the meeting that no action had been taken regarding the sale of the works to the Bethlehem Steel Corporation. This question will come up at a future meeting of the directors.

(*For complete prices see page 678.*)

Wire Prices

May Soon Be Advanced—Heavy Inquiry From Foreign Countries

Pittsburgh, March 21.—No change in the price of wire products has been made since March 1, when prices were put up $2 a ton to $2.40 a keg as the base price for nails. It generally is believed that leading makers will advance quotations further at an early date, since they apparently are not anxious to book additional material. Wire products have advanced $16 a ton during the last 12 months. Canadian, European and far eastern interests are figuring in the American market for heavy tonnages of wire products.

Nuts, Bolts and Rivets

Chicago, March 21.—A further advance on nuts and bolts of 10 to 15 per cent has been announced by makers, bringing present discount to the lowest figure which has been known in many years. Bolt mills are crowded with business for several months ahead and a number of western makers have been practically out of the market for some time. The present advance is believed to be for the purpose of discouraging buying until mills can catch up somewhat on their contracts.

Nuts, Bolts and Rivets

Pittsburgh, March 21.—Manufacturers of nuts and bolts advanced prices from 10 to 15 per cent this week. This advance had been expected since no change in the price of nuts and bolts was made when rivets were advanced $3 a ton to 3.15c for structural rivets, 10 days ago. Ship builders are specifying briskly for rivets and are paying premium prices for much of their tonnage.

Cold Rolled Strip Steel

Pittsburgh, March 21.—Actual sales of cold rolled strip steel indicate that the market is quotable at a range from 5.50c to 6c, or $5 a ton, above the price prevailing a week ago. Despite contrary reports, manufacturers have not opened books for delivery after July 1, although most mills are unable to meet specifications for shipment in less than six months. Several fairly heavy tonnages of cold rolled strip steel have been sold at 6c.

Hold Shell Bars High

Four Cents Seems to be Minimum Price on Such Steel—
Leading Makers of Soft Bars Advance Quotations

Philadelphia, March 20. — Eastern makers of large rounds for munition purposes continue to openly quote 4.25c to 4.50c, mill, and probably would not accept under 4.00c, mill, for any steel of this kind for this year. As noted last week, good tonnages have been sold for domestic and export shipment at 4.25c, mill. Inquiry for shell steel is lighter. J. P. Morgan & Co. have asked for an indefinite tonnage of 1 and 2-inch soft steel bars which is for special shell parts. The general condition of the soft steel bar market has not been altered. Apart from the activities of one or two makers recently in accepting contracts for third quarter and last half, in this district, consumers find the mills will not accept the usual requirement tonnages for term specification. At least two large makers have no quotations at present. The 2.35c, Pittsburgh,, and 2.509c, Philadelphia, contract price remains largely nominal. Early bars bring high prices.

Steel Bars Stronger

Pittsburgh, March 21.—What has been said with reference to the price of plates and shapes, applies to steel bars, which are being held at 2.45c by most manufacturers in western Pennsylvania, or $2 a ton above the nominal market price for future delivery. Tremendous pressure exists for steel bars for the manufacture of shells, although it is difficult to estimate what effect the trouble on the Mexican border has had on the steel market, since mills rolling bars are unable always to determine for what purposes material is intended.

Iron bars continue to be quoted at a range from 2.40c to 2.50c, although the bulk of the tonnage is being sold at the latter figure.

Bars Only at Premium

Chicago, March 21.—The advance of last week, involving $2 per ton on steel bars, which brought the quotation to 2.54c, Chicago mill, has not been repeated, and this remains as the nominal quotation. Of course, at this figure, contracts are only for delivery at the convenience of the mill, and anything like prompt delivery can be obtained only at the cost of considerable premium.

Hard steel bars continued at 2.25c, Chicago mill, and the expected advance in keeping with soft steel has not been made. Some makers are asking 2.35c, Chicago mill, but this has not become common.

Quotations Marked Up

Cleveland, March 21.—The bar market is stronger than ever. Leading companies, which had been quoting 2.35c, are quoting 2.45c on everything except most desirable business. On hoops, 2.75c is now the minimum of leading makers. Shafting has been advanced to 25 off list on car lots and 20 on less than carloads.

Prices Not Important

Buffalo, March 21. — In the upward trend of finished material prices, some of the mills have struck out in advance of the general run of producers in setting prices for tonnages of bars, plates and shapes, where deliveries are possible in third quarter or over the remainder of the year. The prevailing quotations by mills and agencies, however, are 2.50c as a minimum on bars and shapes and 2.75c on plates.

Buyers are seeking to get mills to accept their orders and in this connection are asking no questions as to the matter of prices.

The demand for cold-rolled products continues. Many users are seeking to get in their requirements for third quarter, but the producers for the most part are declining to commit themselves to making deliveries within this period. Some second quarter tonnages have been booked at 25 per cent off the list and this is the indicated minimum.

Bar Iron is Firm.

Chicago, March 21.—Makers of bar iron are holding the market firm at 2.25c, Chicago mill, although one maker on unusually attractive tonnages is understood to be willing to take a small quantity at 2.15c, Chicago mill.

Some makers have sold their tonnage practically 60 days ahead, and are not anxious to take further business at this time. Demand for iron bars is steady and increasing, but present prices are expected to prevail for some time, even though steel bars have advanced considerably.

Hoops, Bands and Shafting

Pittsburgh, March 21.—Generally, steel hoops are being held at 2.75c, and bands at 2.45c by makers in the Greater Pittsburgh district, although there has been no formal change in prices recently. Demand for both products is extremely heavy and shipments are deferred from four to eight months.

Cold rolled steel shafting is being quoted at 25 per cent off the list by more important manufacturers, who are asking as low as 15 per cent off the list for less than carload tonnages. Warehouses have no difficulty in selling shafting at the list price, plus extras.

Higher Prices for Sheets

Upward Tendency More Marked as Supply of Low
Price Sheet Bars Becomes Exhausted

Youngstown, March 21. — Prices on sheets have strengthened during the past few days. Demand continues unabated and with gradual disappearance of the lower-priced sheet bars which some mills had on hand, there is a tendency to hold out for high prices on the finished sheet. Sheet mills are disturbed over the rapidly ascending prices of semi-finished steel. Supplies on hand will carry most of the plants through the second quarter, but some mills are already forecasting an acute shortage in sheet bars around July 1 that may force them on part time. Sheet bars at present price levels are rather unattractive to sheet mills, owing to the hesitancy to load up with high-priced steel, even if finished prices should take another sharp advance. The demand for heavy gage stock has increased greatly. The 2.90c minimum on blue annealed No. 10 gage has disappeared on prompt business. One mill yesterday booked orders for more than a week's rolling capacity at better than 3c. Its order book at present carries sufficient business to keep its heavy mills rolling at capacity well into the last quarter. This interest today advanced its prices to 3.25c for No. 10 gage blue annealed. On Nos. 14-16 gages, in small sizes, a lower base price has been made, but all sheets over 40 x 120 inches are held at 3.25c base. The enormous demand for heavy gages during recent months has caused some mills to be well covered on second half business even before their books for that period are opened. This is due to the heavy

(*For complete prices see page* 678.)

tonnages booked for the last quarter of 1915 and the first half of 1916. Delayed deliveries on this business have resulted in the mills' rolling schedules being made up already into the second half. One mill has some November, 1915, business on its books on which early delivery, even yet, is impossible. This factor is lending additional strength to the market. The market for lighter gages continues to show some of the strength that developed two weeks ago. Demand is good, but the collapse of the roofing trade is still felt. The galvanized sheet market remains unchanged. The uncertain fluctuations in spelter some months ago rendered this market unattractive to most makers.

The shortage of rolling stock still seriously interferes with deliveries. Shipments in gondolas are being made in considerable volume. It should be recalled in this connection that the railroads accept no liability for damage to sheets carried in open cars, but this consideration is outweighed by the imperative need for using what few cars the railroads can furnish.

Sales of Blue Annealed

Cleveland, March 21.—The manufacturer of automobile bodies who has been in the market for 24,000 tons of blue annealed sheets for delivery at the rate of 4,000 tons per month for the last six months of the year has been able to purchase from 5,000 to 6,000 tons in addition to the 5,000 tons reported last week, but is understood to have paid a price considerably in advance of that at which he had hoped to place the business. The prevailing quotation on No. 10 blue annealed by Cleveland mills is 3.50c.

Stronger at Pittsburgh

Pittsburgh, March 21. — Sheet manufacturers have been handicapped considerably because of the irregular sheet bar shipments. Furthermore, most industrial concerns in western Pennsylvania, eastern Ohio and West Virginia have lost much time this year on account of the shortage of gas. Many plants have been closed down entirely for periods ranging from a few hours to several days.

Pressure for all grades of steel sheets continues tremendous and prices are hardening. Since March 1, most mills have been quoting No. 17 to No. 28 gage black sheets at 2.75c as the base for No. 28 gage bessemer black material. Nos. 10 to 16 gage have been quoted at 2.90c for No. 10 gage bessemer black, with blue annealed sheet differentials applying to other gages. Open hearth material is held at $2 a ton above the price of bessemer steel products. No. 28 gage galvanized sheets are being held at 5c and above by most manufacturers in western Pennsylvania. No. 10 gage blue annealed bessemer sheets are firm at 2.90c. Buying for shipment the second half of the year has been active, with automobile builders, agricultural implement makers and electrical equipment manufacturers playing important parts in the buying movement. Decidedly high prices are being obtained for special stocks. During the last 12 months, black sheets advanced $19, blue annealed sheets, $32, and galvanized sheets, $29 a ton.

Eastern Sheets Go Higher

Philadelphia, March 20.—As plates continue their upward climb and the demand for heavy blue annealed sheets and light plates goes further, eastern Pennsylvania makers of the latter lines are naming constantly higher prices. Even then there are frequent instances where tank plates are selling above No. 10 gage blue annealed sheets. The minimum price for sheets of this gage and quality by eastern Pennsylvania makers now is 3.50c, Pittsburgh, or 3.659c, Philadelphia. The demand is strong, but producers do not care to sell freely as far ahead as their bookings require. Where consumers insist, however, there have been some contracts running into the third quarter.

Irregular at Chicago

Chicago, March 21.—Considerable irregularity continues in the sheet market. Quotations are nominally 3.09c to 3.19c, Chicago mill, for No. 28 gage black sheets, and 3.19c to 3.29c, Chicago mill, for No. 10 gage blue annealed.

Considerably higher quotations than these are being made by many mills and a quotation of 3.39c, Chicago, for No. 28 gage black was received this week from an Ohio mill.

For some obscure reason, some makers seem anxious to obtain tonnage and often are quoting $4 to $6 below prevailing levels, in order to obtain tonnage.

Demand for blue annealed is the strongest feature of the sheet market, and prices seem likely to advance further.

Tin Plate Advances

Youngstown, March 21.—The market for tin plate continues to strengthen. With the bulk of the available tonnage for 1916 delivery, placed some months ago, consumers are offering high prices for the tonnage that mills will still accept. Prices for prompt shipments are advancing, one mill having closed for a small tonnage of domestic business at $5.00. This mill has temporarily withdrawn from the market. The export demand is still enormous and high prices are coming out for this trade. One mill has closed for 6,000 base boxes for delivery in England, at $4.80. The export demand is coming largely from England and her colonies, China and South America.

(For complete prices see page 678.)

Metal Markets

Have Been Quiet With Exception of Lead—Fair Demand for Spelter.

New York, March 21.—The metal markets during the past week have been fairly quiet with the exception of lead. The latter metal has been in heavy demand, principally for export to Japan, and prices have reflected a sharp upward tendency. Independent producers say they now are sold up practically through April and are not anxious to book further large tonnages. The outside market may be quoted at 7.87½c to 8.12½c, New York, and 7.87½c to 8.25c, St. Louis; thus, for the first time, the St. Louis market is quoted somewhat higher than New York. This is due to the fact that most of the foreign business recently placed is for shipment by way of the Pacific coast. The American Smelting & Refining Co. continues to quote 7c, New York, and 6.92½c, St. Louis, but these prices are entirely nominal, since this interest is booking no business.

The spelter market developed an upward price tendency last week and a fair business was transacted. The market now is quiet but steady and prime western spelter is quoted as follows: Prompt, 17.62½c to 17.75c, St. Louis; March, 17.50c; April, 17c; May, 16.50c; June, 16c; third quarter, 15c. Brass special for prompt shipment is quoted at 20c to 25c, St. Louis.

The copper market was characterized by some business last week but in general the situation has remained quiet. Electrolytic for shipment beyond May continues to be quoted at 26.50c to 27c, delivered 30 days. Electrolytic for prompt and nearby shipment by second hands is quoted at 27.50c to 27.75c, cash. Ordinary lake copper is quoted by the producers at 27.25c to 27.50c, cash, beyond May and at 27.50c to 27.75c, cash, for prompt and nearby shipment by second hands.

The tin market last week reflected exceedingly high prices on spot material, but due to further arrivals, prices are receding. Spot is quoted at 49.75c; March 49.62½c to 49.75c; April, 49c to 47.50c, depending on the arrival. Tin ex steamers now unloading in this port is offered at 49.25c. A fair volume of business was transacted during the week, comprising mostly future shipments.

The antimony market continues to reflect somewhat higher prices, due to the scarcity of spot material. Domestic for spot delivery is quoted at 44c to 45c, New York. Wah Chang's W C C is quoted as follows: Spot, 44.50c to 45c; March delivery, 43c, duty paid; March shipment from China, 34.50c, in bond; April shipment from China, 34.50c, in bond.

The aluminum market is dull. No. 1 ingots in carload lots now are quoted at 58c to 60c, for prompt shipment in carload lots.

The plant of the Cyclops Tool Steel Works, Titusville, Pa., formerly owned by Chas. Burgess of Titusville, has been sold to Carl F. Boker of New York, representing a syndicate of eastern capitalists. The plant will be enlarged.

Over Five Cents for Plates

Is Reported in East and Large Tonnages Are Being Sold at 3.50c to 4c, Pittsburgh—Inquiries for Vessels

Philadelphia, March 21.—Tremendous strength remains common to the eastern plate market. Further sales of carload and smaller lots for prompt shipment have been made at 5.00c and 5.25c, Pittsburgh, or 5.15c to 5.409c, Philadelphia, where makers can work into their mill schedules these lots without interfering with their service to their regular trade. There is an unconfirmed report of a sale at considerably higher than 5.25c, Pittsburgh. One important maker has been taking a considerable tonnage at 3.75c to 4c, Pittsburgh, or 3.909c to 4.159c, Philadelphia, for specification during the second quarter, but for delivery not before five to six months. It is reported that there is no trouble to get these prices. Other eastern plate makers are following regular schedules ranging from 3.50c to 4c, Pittsburgh. New tonnage remains heavy. Three different shipyards put out inquiries the past week for six vessels calling for 15,000 to 20,000 tons of plates on which they are figuring. There are probably some duplications in these requirements. About 2,000 tons for a new Munson line boat, placed with the Newport News yard, will go to eastern and Pittsburgh mills. The Pennsylvania railroad again is in the market for a car plate tonnage for Altoona, but does not specify the quantity. There is much inquiry for locomotive plates.

High Prices

Cleveland, March 21.—An eastern Pennsylvania plate mill which has been selling at 3.60c, Pittsburgh, for delivery in four to six months, has advanced its quotation to 3.75c and is not anxious to take on additional orders even at that high price. Cleveland mills are quoting 3.25c to 3.50c, Pittsburgh, for fairly prompt delivery.

Plates Held at 2.75c

Pittsburgh, March 21. — The 2.60c price, adopted a fortnight ago by leading manufacturers, no longer represents the market for steel plates for future delivery. Although that figure has not been formally withdrawn, most mills are refusing to book additional tonnage at less than 2.75c for delivery at their convenience. As previously pointed out by *The Iron Trade Review*, considerable tonnage has been sold to shipbuilders at 2.75c for 1917 shipment. As a matter of fact, scarcely any additional material is available, for distribution this year. During the last 12 months, steel plates have advanced $30 a ton for future delivery, having been quoted at 1.10c a year ago at this time. Frequent predictions are heard that plates for future delivery will be sold at about 3c a pound for future shipment, before July 1. Heavy tonnages for prompt shipment already have been sold at that price.

Plates Continue Scarce

Chicago, March 21. — Continued scarcity of steel plates is the feature of the steel market and the differential between plates and bars is becoming more accented each week. The advance last week brought plates from mill to a level of 2.79c, Chicago mill. Prompt plates carry a premium bringing the price as high as 4.00c, Pittsburgh, on some tonnages where immediate delivery is necessary. Scarcity of this form of finished steel is indicated by the addition of $7 per ton last week, by Chicago warehouses, bringing the price to 3.50c, Chicago store.

Car and Ship Plates.

New York, March 21.—Considerable buying of car and ship plates for delivery in the first quarter of 1917 is being done from large producers at prices which are reported to be at 2.75c, Pittsburgh minimum. Makers find it difficult to take on heavy tonnages for shipment before that time because of their tremendous bookings. One lot of 8,000 tons for shipment this year now is before the mills and it is difficult to arrange for its accommodation. A contract for another tank vessel requiring about 5,000 tons of steel has been placed with an eastern yard.

Will Make Large Extensions

Announcement is made that the New Process Steel Co., Lancaster, Pa., is to increase its capital stock from $50,000 to $1,000,000. Options have been taken by the company on 10 acres adjoining its plant and large extensions will be made. The stock increase will consist of $450,000 common and $500,000 preferred.

The Ohio Painting & Sheeting Co., office, Cleveland, has placed an order with the Brown Hoisting Machinery Co., Cleveland, for 25 tons of patent rivet clips for fastening corrugated sheeting. These clips are guaranteed by the Ohio company as to wearing qualities.

(For complete prices see page 678.)

Cast Iron Pipe

Advances Shown by Comparison of Prices at Cleveland

Cleveland, March 21.—One year ago, bids were taken by the city of Cleveland on cast iron pipe. On March 15, 1916, bids were again received on 4,500 tons of this material and a comparison of prices of last year with the recent figures, is an interesting table. Both sets of figures are taken from the bid of the United States Cast Iron Pipe & Foundry Co., the low bidder, to which the 4,500 tons will be awarded Friday.

In 1915 the following prices were submitted: For each ton of 3-inch pipe, delivered, $32.75; in 1916, $42.85; for each ton of 4-inch, 1915, delivered, $25.75; 1916, $34.85; for each ton of 6 to 48-inch, $23.75; 1916 for each ton of 6 to 8-inch, delivered, $31.85, and for each ton of 10 to 48-inch, delivered, $31.35.

For each ton of 3 to 16-inch special castings, 1915, delivered, $55.00; for each ton of 3 to 16-inch special castings, 1916, delivered, $60.00. For each ton of miscellaneous castings, delivered, 1915, $55.00; for each ton of the same grade, delivered, 1916, $60.00.

Buying is Slow

Chicago, March 21.—Cities continue to be backward about inquiring for their requirements of cast iron pipe for the present year. At present, comparatively little is in prospect for bidding this month, and it is believed that April must bring out large tonnages unless cities have decided to postpone extensions for this year, on account of high prices.

The United States Cast Iron Pipe & Foundry Co. is low bidder on 4,580 tons at Cleveland. The American Cast Iron Pipe Co. has been awarded 1,000 tons at Salt Lake City, and Jas. B. Clow & Son have been awarded 1,240 tons at Jackson, Mich. Bids will be opened March 27, at Euclid, O., on 200 tons.

Improved in South

Birmingham, Ala., March 21.—The cast iron pipe interests report that business has taken on quite a different aspect compared with the week previous. One manufacturer reports that he considers his plant well sold up for several months ahead. Another manufacturer reports sales and inquiries most satisfactory. One large pipe company is running its plants in the state on full time, and reports

business with it as good. There has been no change in prices, which are quoted as follows, per net ton f. o. b. cars at the plants, standard pipe: Four-inch to 6-inch, $28; 6-inch and up, $25; with $1 per ton extra for gas pipe and 16-foot lengths.

Mostly From Private Buyers

New York, March 21.—Most of the tonnage now being booked by the eastern pipe foundries is from the private buyers. Public lettings still are comparatively few and scattered and call for moderate quantities. Prices show steadiness. The Standard Cast Iron Pipe & Foundry Co. is the low bidder at $29.98, delivered, on 1,230 tons of 4, 6, 8, 12 and 20-inch for Brooklyn delivery, and at $60 for special castings. The Standard company also took 240 tons of 6 to 12's for New Brunswick, N. J. Boston will take bids March 27 on 140 tons of 8 to 12's and Cambridge, Mass., is inquiring for about 200 tons.

Higher Billet Prices

Are Being Paid and the Demand Exceeds the Supply

Youngstown, March 21.—The market for semi-finished steel is gaining strength almost hourly. The conviction that a shortage of raw steel will become acute within a few months at the latest has extended from producer to consumer. Makers are giving serious consideration to this phase of the situation, but with every steelmaking unit running at capacity or over, producers can see little relief ahead.

Prices for billets and sheet bars have attained unparalleled heights. One sale has been made of plain open hearth soft steel billets at $57.50. The discards from billets rolled to foreign specifications now command from $45 to $50, 600 tons being sold yesterday at the former figure. These discards originally went at $26, jumping successively to $36, $40 and $45. One maker in contiguous territory, who only recently entered the semi-finished steel market, is said to be holding for $47.50 for billets and sheet bars.

Allowance, of course, must be made for the fact that some of these prices are in the nature of premiums, due to the imperative need of a particular consumer and the limited number of mills which can give anything like prompt shipment on even small tonnages. Producers, in general, are well sold up for the second quarter and the tonnage moving represents the smaller part of their total capacity. Sheet bar consumers in this district have not been hampered by a scarcity of raw steel up until this time, and are fairly well covered through the second quarter. Few contracts have been drawn for third quarter delivery, however. Sheet mills point out the disparity between sheets at present price levels and sheet bars at $40 or more. In addition, these mills will display some reluctance in closing for any considerable tonnage at present prices. Sheet bar contracts are absolute and consumers will hesitate to load up with high-priced steel. Two factors, therefore, would indicate that a hand-to-mouth policy may be expected for some time. These are the enormous demands on producers which are driving prices to higher levels, rendering contracts, even at today's figure, less attractive and, secondly, the unwillingness of the consumer to close for any considerable tonnage with sheets quoted at present prices.

Stronger at Pittsburgh

Pittsburgh, March 21.—Consumers of billets and sheet bars, who buy material on long-term contracts, quietly are covering needs for the second quarter of the year at prices almost identical with those prevailing for prompt shipment. According to several buyers, billets are not obtainable at less than $45 and sheet bars at less than $46 for shipment after July 1. The market for prompt delivery is rather quiet and prevailing quotations have not been severely tested. Scattering lots of billets have been sold at $40 and small tonages of sheet bars have commanded $42 a ton the last 10 days.

Wire rods are being held at $60 a ton by several of the more prominent manufacturers, although no sales are being made in the open market. Canadian and European consumers are asking quotations on heavy tonnages of rods. Muck bar nominally is listed at $40, Pittsburgh.

Semi-Finshed Going Up

Philadelphia, March 20.—Still higher prices for semi-finished steel are being obtained by eastern Pennsylvania makers under a demand that exceeds the tonnage they can offer. One leading producer now is holding open hearth rolling billets at $50 to $55, mill, and forging billets at $65 to $75, mill. Sales have been made at both points of this range, usually to regular customers, as most of the inquirers from the outside trade cannot be accommodated. Most of the sales are for third quarter delivery. Eastern Pennsylvania steelmakers who have been selling discards from shell billets, blooms and ingots have been obtaining generally about $30, mill, for this stock, though for small lots $40, mill, has been received. An Ohio maker has been marketing odd lengths in billets, slabs and ingots in this territory at $40, mill. There was a report in the market here today that an inquiry for 100,000 tons of billets for Australia had been offered.

A Cumberland, Md., tin plate maker who recently had inquired for a tonnage of sheet bars for forward delivery reports he has placed this order and now is well supplied on his needs for the remainder of the year.

(*For complete prices see page* 678.)

Coke is Quiet

And Embargo Just Issued May Further Weaken Market

Pittsburgh, March 21. — The market for Connellsville coke, in marked contrast with that for pig iron, is quiet. Scarcely any fuel is being sold for spot shipment and blast furnace managers are not covering future needs. Prompt furnace coke is being offered at a range from $3.50 to $3.75, ovens, and contract fuel is commanding $3, ovens. The embargo against the shipment of all commodities, except live stock and perishable goods to Buffalo, declared yesterday by the New York Central lines, may tend to weaken the market for spot coke, although railroad officials say the embargo will not exist long.

The market for foundry coke is fairly active, but prices are unchanged in position. Several sellers are offering fuel at $3.60, ovens, for last half delivery, although one cokemaker is obtaining $3.75, ovens, for that delivery.

The Connellsville Courier says production of coke in the upper and lower Connellsville regions the week ending March 11, was 457,894 tons, an increase of 13,552 tons, compared with the week previous.

Sales Large

Cincinnati, March 21. — Buying by foundries on contract continues very heavy. A few inquiries are out for furnace coke, but these are mostly to fill in between shipments on old contracts. The tonnage of furnace fuel sold by Pocahontas, New River and Wise county operators since the first of the year has been very large, and some have none of this grade to offer for any delivery until the last quarter of the year. Prices are very strong, Wise county foundry contract coke is quoted at $3.50 to $3.75, ovens, and Pocahontas contract foundry and New River contract furnace grades at from $3.25 to $3.75, ovens.

Fabricated Shapes Higher

But There is More Activity in Some Districts—Several Important Hotel Projects in New York City

New York, March 21.—More activity has been shown the past week in the fabricated steel market in the metropolitan and other eastern districts than at any time in several months. The recent withdrawal of a number of speculative jobs because of the higher prices seems to have cleared the air and most of the work now being projected is reasonably sure of going ahead regardless of the much greater cost. Among the heavy tonnages in sight are those for three hotels, two of which will run about 15,000 tons each and the other considerably more. At least two of these projects are scheduled to be put through in the near future, as general contracts have been placed. A considerable amount of work still is being placed quietly. Freight embargoes have pushed back deliveries of fabricated work from four to six weeks in the affected territory. The completion of several jobs has been delayed by the retarded shipments from the shops. The demand for plain material is very strong and high prices are being paid by users without hesitation. Eastern mills ask from 2.50c to 3c, Pittsburgh, or 2.669c to 3.169c, New York, for delivery as they are able. There is some buying of car and ship shapes into 1917. Fabricated prices are going up irregularly. At least $70, delivered New York, is being obtained, while extra prompt shipments have brought 5c per pound, erected.

Good Third Quarter Sales

Philadelphia, March 20.—Some good-sized tonnages have been sold by eastern Pennsylvania shape makers to large and preferred customers for specification during the third quarter at 2.50c, Pittsburgh, or 2.659c, Philadelphia. These bookings leave the sellers reluctant to take on much further tonnage at this time. One maker now is asking 3.00c, Pittsburgh, as a minimum, an advance of $10 a ton, and is not seeking much new business. Another eastern Pennsylvania maker has sold a good tonnage of ship shapes, for delivery into next year, the price not being given. The minimum eastern market for three to four months delivery on any sizeable tonnage, is 2.50c, Pittsburgh, or 2.659c, Philadelphia. For delivery in a week to ten days, 3.25c, Pittsburgh, is being obtained, one eastern mill taking about 500 tons at this figure. It is understood the local shapemaker can offer very prompt deliveries. High fabricated prices are being paid for early delivery. One lot of about 500 tons for New York was placed here at 5 cents per pound, delivered. The Pennsylvania railroad is in the market for an indefinite tonnage of shapes for Altoona.

Shapes Command 2.45c

Pittsburgh, March 21.—Manufacturers of structural shapes no longer are willing to sell material for future delivery at 2.35c, the price adopted a short time ago. Most mills are asking 2.45c and above for delivery at their convenience and it generally is believed that quotations below 2.45c will disappear before the end of the week. Fabricators are enjoying extremely active conditions and they have enough tonnage on their books to keep plants operating at maximum capacity for from four to eight months.

Better Shape Tonnage

Chicago, March 21.—Structural lettings in the west during the past week involve more projects and some are for better tonnages than has been the rule during the past few weeks. The largest letting involves 4,000 tons for a warehouse for the Central Cold Storage Co., which has been taken by the American Bridge Co. The next largest tonnage involves 2,636 tons for an addition to the Corwith plant of the Crane Co., in Chicago, which also went to the American Bridge Co.

Other lettings are for tonnages under 1,000 tons each, and fairly well scattered over the west.

CONTRACTS AWARDED.

Donner Steel Co., Buffalo, new open-hearth plant addition, 4,500 tons structural, contract to McClintic-Marshall Co., Pittsburgh.

Donner Steel Co., Buffalo, 1,200-foot ore dock, requiring 1,100 tons reinforcing bars, general contract to Great Lakes Dredge & Dock Co., Buffalo.

General Electric Co., Erie, Pa., plant addition, contract to McClintic-Marshall Co., Pittsburgh, requiring 300 tons structural.

Lafayette Hotel, Buffalo, ballroom addition, requiring 100 tons structural, contract to Charles H. Everett, Buffalo.

New High School, East Aurora, N. Y., 150 tons structural, contract to Kellogg Structural Steel Co., Buffalo.

Buffalo Creek Ry., Buffalo, new dock, city ship canal, requiring 100 tons reinforcing bars, general contract to Great Lakes Dredge & Dock Co., Buffalo.

Cathedral exchange for the New York Telephone Co., New York City, 900 tons to Eidlitz & Ross.

Wetherly loft building, Thirty-ninth street, New York City, 700 tons, to the Passaic Structural Steel Co.

Rosenbloom arcade, Syracuse, N. Y., 400 tons, to A. B. Haley.

Auditorium for the National Festival Chorus of America, Black Mountain, N. C., 800 tons, to the Virginia Bridge & Iron Works.

Ayer loft building at Broadway, Mercer and Houston streets, New York City, 2,200 tons to the Hay Foundry & Iron Works.

Warehouses for the Norfolk & Western railroad at Lamberts Point, Va., 2,500 tons, to the Virginia Bridge & Iron Works.

Bridge for Lehigh valley railroad, Rochester, N. Y., 650 tons, to an independent shop.

Commonwealth hotel, 30 stories, Seventh avenue and Fiftieth street, New York City, about 25,000 tons, general contract to Hoggson Bros. Structure will be largest of its kind in the world.

Hotel for Pennsylvania railroad on Seventh avenue between Thirty-second and Thirty-third streets, New York City, about 15,000 tons, general contract to the Geo. A. Fuller Co.

Twenty-five small signal and track bridges, various locations, for New York Central railroad, 250 tons, to an independent shop.

Two bridges for City of Philadelphia, 250 tons, to an independent shop.

Two bridges for the Pennsylvania railroad, 250 tons, to an independent shop.

Hotel, Fairmont, W. Va., 600 tons to the McClintic-Marshall Co.

Bridge work for the Baltimore & Ohio railroad, 1,400 tons, to the King Bridge Co.

Garage for John Wanamaker, Philadelphia, 500 tons, to Levering & Gerrigues.

Building for Willys Overland Motor Co., New York City, 700 tons, to Levering & Gerrigues.

Building for Merchants Refrigerating Co., Tenth avenue and Sixteenth street, New York City, 1,000 tons, to Levering & Gerrigues.

Central Cold Storage Co., warehouse, Chicago, 4,000 tons, to American Bridge Co.

Crane Co., addition to Corwith plant, Chicago, 2,636 tons, to American Bridge Co.

Chicago, Burlington & Quincy Railroad Co., 16-deck plate girder span, 740 tons, to King Bridge Co.

Chicago & Eastern Illinois R. R. Co., seven 91-foot girder spans, 691 tons, to Milwaukee Bridge Co.

Fort Wayne Electric Co., building, Fort Wayne, Ind., 595 tons, to American Bridge Co.

Granby Mining & Smelting Co., two furnace buildings, East St. Louis, Ill., 316 tons, to Decatur Bridge Co.

Main exchange building, Wisconsin Telephone Co., Milwaukee, 2,600 tons, to Wisconsin Bridge & Iron Co., 605 Colby-Abbot building, Milwaukee, Wis. (Previously reported at 1,200 tons, but changed later to 2,600 tons.)

CONTRACTS PENDING.

Bridge work for Atlantic Coast line, 800 tons, bids being taken.

Reinforcing of the elevated lines for Interborough Rapid Transit Co., New York City, 700 tons, bids being taken.

Large hotel for New York Central railroad interests, Lexington avenue between Forty-second and Forty-third streets, New York City, about 15,000 tons, plans under construction.

Building for the New York Ship Building Co., Camden, N. J., 300 tons, bids being taken.

Loft building for P. W. Rouss, Green street, New York City, 1,700 tons, bids being taken.

Bridge work for the Baltimore & Ohio rail-

(*For complete prices see page 678.*)

road in Chicago, 200 tons, bids being taken.

United States Customs House, Wilmington, Dela., 400 tons, bids being taken.

Building in New York Central terminal zone, New York City, 200 tons, bids being taken.

Masonic temple, Cleveland, 1,500 tons.

Free hotel, Cleveland, 3,000 tons.

Heavy Rail Orders

Have Been Placed and Heavy Tonnage is Practically Closed

New York, March 22. (By wire.)—Heavy rail sales for 1917 continue. The Baltimore & Ohio has now distributed 75,000 tons, of which 50,000 went to the Corporation, 15,000 to Maryland Steel Co. and 10,000 elsewhere. The Burlington takes 20,000 tons, the Chicago & North-Western 40,000, the Santa Fe 10,000 additional, while the Katy practically has closed for 15,000 tons, all going to the Illinois Steel Co.. The Atlantic Coast Line has awarded 15,000 tons to the Tennessee company and scattered sales are 16,000 tons, including 6,000 to the Illinois Steel Co. for the Stone Construction Co. for a Kansas line.

The Pennsylvania has opened negotiations for rails and is expected to close soon.

More Than 500,000 Tons Placed

New York, March 21. — Rail buying for delivery in the first half of 1917 has been continuing briskly and it is estimated that at least 500,000 tons for that period, now have been booked by the mills, while the orders tentatively closed will swell this figure considerable. Four or five of the important eastern systems, or those which have purchasing headquarters in this city, have practically placed about 250,000 tons, with various mills during the past few days, including one lot of 100,000 to 125,000 tons. Details are not yet ready for announcement but one of these orders is 15,000 tons to the Illinois Steel Co. for the Union Pacific railroad. The Baltimore & Ohio is about to place 50,000 to 75,000 tons, the Boston & Maine, 15,000 to 20,000 tons, the Missouri, Kansas & Texas, 15,000 tons, the Erie, 30,000 to 40,000 tons, the New Haven is reported to be figuring, while many other systems are showing interest in the matter of their next year's requirements. The Pennsylvania railroad has not yet inquired or asked for reservations. Car buying activity continues lively. About 10,000 cars are active. Orders placed the past week, include the following:

New York Central lines, 1,000 gondolas to the Standard Steel Car Co. and 500 coal reported to have gone to the American Car & Foundry Co.

New inquiries include the following:

Carnegie Steel Co., 60 gondolas, 10 hoppers, 10 flats and 25 mine.

Warner Sugar Refining Co., 50 to 125 cane.

Calumet & Arizona Mining Co., 30 tank.

Russel Car & Snow Plow Co., 300 tank.

United Verde Copper Co., 30 ore.

Allis Chalmers Mfg. Co., 12 flat and five gondolas.

Federal Dye Stuff & Chemical Co., 30 tank.

Long Island railroad, 15 refrigerators.

American Sheet & Tin Plate Co., 10 street cars.

New York Central lines 10 to 30 motor passenger equipment.

The Chicago Junction railway has placed five locomotives, the Montour railway four, the Pekin-Calgan railway four, and the Chicago River & Indiana railway, the Green Bay & Western railroad and the Nevada Northern railroad one each all with the American Locomotive Co.

Rails for Wheeling

Cleveland, March 21.—The Carnegie Steel Co. has taken 15,000 tons of 90-pound rails for Wheeling & Lake Erie. Railroad inquiries for bridge material include 800 tons for the Burlington, 225 tons for the Chesapeake & Ohio and 200 tons for the Louisville & Nashville.

Selling Many Rails

Chicago, March 21.—Heavy sales of steel rails are being made for 1917 delivery. During the past week, approximately 200,000 tons have been contracted by the leading interest for the Burlington, the New York Central, Illinois Central, Santa Fe, North Western and the Union Pacific railroad. This is in addition to 40,000 tons placed by the St. Paul railroad about 10 days ago with the same maker. This tonnage is in addition to a considerable aggregate of small contracts, and altogether this represents nearly six months' work of the rail mills in this district. Most of these roads are seeking to specify for first half delivery, while mills are endeavoring to distribute the tonnage over the entire year, and final details on some contracts have not yet been settled.

Heavy buying of tie plates, bolts, spikes and other fastenings are being made steadily at prevailing quotations.

Orders Locomotives

The New York, New Haven & Hartford Railroad Co. has ordered 50 powerful locomotives to cost about $2,250,000 from the Westinghouse Electric Co. This action was taken because of the amount of traffic and because the road has been overtaxed for some time with its present equipment.

The Columbia Steel Co., Elyria, O., is in the market for two double-annealing furnaces for treatment of cold rolled strip steel.

(*For complete prices see page* 678.)

Wharton Properties

Will Be Transferred to the Eastern Finance Corporation

Dover, N. J., March 21.—The option and transfer of the furnaces and mines of the Wharton Steel Co., at Wharton and Hibernia, N. J., and the Wharton & Northern railroad from the Wharton heirs to the Eastern Finance Corporation, of New York, has been recorded here with the county clerk. The original option price for furnace and mines is fixed at $1,500,000. Title is expected to pass about April 1.

It was through the transfer of an option held by Nils L. C. Kaphelmacher, of Columbus, O., that the Eastern Finance Corporation was enabled to acquire the property.

Higher Wages

For Engineers of Pittsburgh Steamship Co.—Will Obey Seamen's Law.

At the fleet meeting of the Pittsburgh Steamship Co., March 21, President Coulby advised the officers of ships to obey to the letter the seamen's law and announced advances in wages.

The men will get an advance all along the line. In addition to the increase in wages the chief engineers, who have heretofore been paid for 11 months a year, will be paid for 12 months, and assistant engineers, who were formerly paid for the time they were employed, will receive wages for 10 months a year.

The chief engineers of first-class steamers will be paid at the rate of $180 a month, or $2,160 a year, which is an advance of $5 a month and an addition of a month's wages.

Rivets Advanced

Pittsburgh, March 22. (By wire.)—Leading manufacturers of steel rivets of western Pennsylvania today advanced prices $2 a ton, to 3.25c on structural and 3.35c for boiler rivets. Rivets were put up $3 a ton 10 days ago.

More Extensions

Pittsburgh, March 22. (By wire.)—The Shelby Steel Tube Co., Pittsburgh, which started to double its capacity last autumn, has completed plans for further extensions, including an additional piercing mill, a rolling mill, cold draw benches, annealing furnaces and finishing machinery.

Wallace McDonald, manager of the McDonald shipyards, Mystic, Conn., died recently from heart disease.

MEN OF THE IRON TRADE

Who they are **Where they are** **What they are doing**

Ralph H. Sweetser, who has been president and general manager of the Thomas Iron Co., Hokendauqua, Pa., since July 3, 1913, has resigned, effective July 1. Mr. Sweetser has been one of the most active and leading executives of the eastern iron industry and at the present time is serving as president of the Eastern Pig Iron Association. By his progressive and able management of the Thomas Iron Co., he has brought the affairs and property of that company to a high scale of efficiency and strength. Mr. Sweetser is regarded as among the ablest of blast furnace managers. Before he went to the Thomas Iron Co., he occupied the position of superintendent of the Columbus Iron & Steel Co., Columbus, O., where he had established a highly creditable record. Prior to that time, he was connected with several furnace plants. He has not made known what his plans are for the future.

Geo. P. Lawrence, formerly superintendent of the W. W. Sly Mfg. Co., Cleveland, is now connected with Standard Sand & Machine Co., that city, in the same capacity.

G. L. Hothny, until recently identified with the Westinghouse Machine Co., East Pittsburgh, Pa., now is consulting engineer of the C. H. Wheeler Mfg. Co., Philadelphia.

E. P. Worden, formerly affiliated with the Fred M. Prescott Steam Pump Works, Milwaukee, has been appointed chief engineer of the Henry R. Worthington plant, Harrison, N. J.

W. S. Chase, who for the past 13 years has headed the sales department of the National-Acme Mfg. Co., Cleveland, has resigned and will spend an indefinite time on his ranch in Idaho.

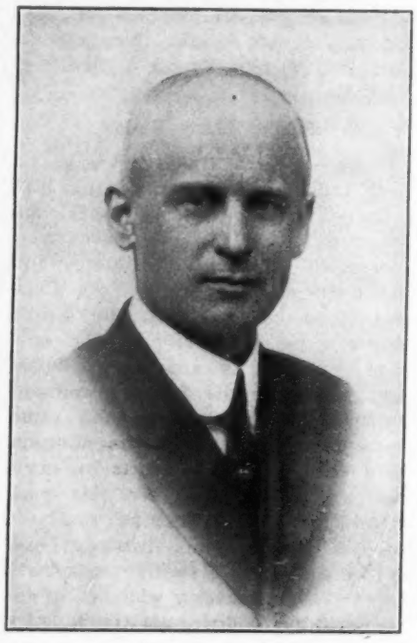
George Kingdon Parsons, consulting engineer, has opened main offices in the Equitable building, 120 Broadway, New York City. Mr. Parsons also maintains an office in the Riggs building, Washington, D. C.

P. P. Bourne, formerly chief engineer of the Blake & Knowles Steam Pump Works, East Cambridge, Mass., again is associated with the International Steam Pump Co., New York City, in an engineering capacity.

D. M. Armstead, connected with the Pittsburgh office of the Ingersoll-Rand Co., New York, has been transferred to St. Louis, where he will have charge of sales in the St. Louis district.

Mrs. J. E. Fellows has been appointed manager of the coal properties of John E. Miller & Son, at Port Huron, Mich. The firm has 600 feet of dockage with modern facilities for fueling vessels. Mrs. Fellows succeeds her husband, who died Jan. 28.

E. L. Fladd has been appointed assistant superintendent of the blast furnace plant of the Carnegie Steel Co. at the Ohio works, Youngstown. Mr. Fladd had been identified with the department in charge of the sale of slag.



RALPH H. SWEETSER

R. B. Anthony, who was manager of the Pittsburgh district for the Bristol Instrument Co., Waterbury, Conn., for several years, and more recently in charge of the Chicago office of that concern, has purchased properties of the E. A. Wilcox Mfg. Co., 6330 Story Island avenue, Chicago. The company manufactures a diversified line of gaskets and valve stem packings. Mr. Anthony is well known in the iron and allied trades. He is an associate member of the American Institute of Electrical Engineers and the Association of Iron and Steel Electrical Engineers. J. S. Longnecker, 421 Wood street, is Pittsburgh representative of the Wilcox company.

James M. Burdick, superintendent of the Stanley Rule & Level Co., New Britain, Conn., has been promoted to the new office of general superintendent. Harris J. Cook succeeds Mr. Burdick as superintendent and Albert W. Ritter has been promoted to the assistant superintendency.

C. S. Belsterling, traffic manager of the American Bridge Co., Pittsburgh, has resigned to join the legal department of the United States Steel Corporation, with which he has been closely identified for a number of years. His successor has not been named.

Rudolph C. Koblitz and Marton B. Koblitz have formed a partnership under the name of R. C. Koblitz & Son, Cleveland, to engage as wholesale dealers of iron and steel scrap and rubber. The company has leased a warehouse building on Canal road and the Baltimore & Ohio railroad tracks.

Ralph C. Coburn has been appointed sales manager of the electrical department of the Franklin Railway Supply Co. Mr. Coburn has been associated with the Franklin company for the past seven years, being formerly in charge of its Chicago office and for the last few years eastern sales manager with headquarters in New York, where he will continue in his new capacity.

Waldo Marshall, president of the American Locomotive Co. and vice president of the Fairbanks-Morse Co.; W. D. Baldwin, president of the Otis Elevator Co.; Henry J. Fuller president of the Canadian Fairbanks-Morse Co. and vice president of the Fairbanks-Morse Co., and John R. McGinley, president of the Duff Mfg. Co. and chairman of the board of the Chicago Pneumatic Tool Co., have been made directors of the Poole Engineering & Machine Co. These new directors and S. Proctor Brady, president of the Poole Engineering & Machine Co., and H. D. Gibson, vice president of the Liberty National Bank of New York City, will make up the executive committee.

May Defeat the Armor Plate Bill

Which Will Probably Have Rough Sledding in the House—Republicans in Lower Branch of Congress Solidly Arrayed Against Tillman Measure

Washington, March 21.—The passage of the Tillman armor plate bill in the senate by no means signifies an end of the fight on it made by its opponents. Provided it reaches the house floor, it is certain that it will be the object of strong attack there. The senate has a strong Democratic majority, and the bill was given additional support in that body by the so-called progressive members of the Republican party. No such situation prevails in the house which, this session, has a small Democratic majority, and if the Republicans in the lower body line up against the bill, as seems probable, and are aided by a comparatively small number of Democrats —say 13 or 15—the bill could be defeated. It is known there are a number of Democrats in the house who are opposed to the measure. Considerable interest is also being shown as to what attitude on the question may be assumed by Chairman Fitzgerald of the powerful committee on appropriations. Mr. Fitzgerald has been called the "watchdog of the treasury," and it is doubtful in the minds of many whether he is willing to favor the appropriation of $11,000,000 and probably more to build or buy a government armor plate plant, both a socialistic and hazardous scheme. With Mr. Fitzgerald and other Tammany Democrats and others of his party opposed to the bill, it is readily imaginable that it could be defeated in the house. The depleted condition of the federal treasury is a factor against appropriations for an armor plate plant.

Chairman Padgett of the house committee on naval affairs, who has asked armor plate manufacturers to appear before the committee tomorrow to give testimony on the bill, is himself opposed to it. He is a strong administration supporter in nearly all legislation, but doesn't like the idea of the government entering into the manufacture of armor plate. Whether his personal opposition to the bill will be used to such an extent to have it killed in the house committee or to fight it if it comes to the house floor, remains a question.

The Republicans in the house are lining up strongly, making ready to fight the bill if it comes before that body. It may be urged by those opposing the measure that the manufacturers, if they find it necessary, go personally before President Wilson and lay the facts of the situation before him. It is contended that the President has heard only one—and the incorrect—side of the story and that he might possibly change his opinion and abandon the bill if appeal is made to him by manufacturers. Suggestions have also been made that the President might be asked to have the federal trade commission of expert accountants make an inventory of the armor plate plants to learn the facts in the case before the bill is passed, $25,000,000 worth of private property detsroyed, and the country left in peril in case of war or impending war.

It is thought that the manufacturers who will appear before the house committee tomorrow will be President E. G. Grace of the Bethlehem Steel Co., and Vice President William P. Barba of the Midvale Steel & Ordnance Co.

Closing Debate Lively

Washington, March 21.—Before the passage in the senate on the armor plate bill, by a vote of 58 to 23, spirited debate took place among those favoring and opposing it. The principal speeches against the bill were made by Senators Oliver and Penrose, of Pennsylvania, and Senator Harding, of Ohio, while the chief one against it was made by Senator Swanson, of Virginia.

It is a safe assertion that never before were the real facts with regard to the armor plate question so elaborately and well laid before congress as they have been during the present debate on the administration bill, providing for a government-owned armor plate plant with an annual capacity of 20,000 tons. The bill appropriates $11,000,000 for the plant. So convincing were speeches made against the bill by those opposing it, that it is confidently believed some who favored it changed their minds, but, for political or other reasons, would not change their voices.

Senator Harding, in a brilliant speech, appealed to the senate to move along in devotion to duty, confident of such public approval and support as the merit of its action commands. He confessed that at first he was inclined to favor the bill, but after studying the question, became convinced it was a bad measure. It seemed to him, he said, to be reasonable now that if there is any line of development which might be sanctioned it is in the line of armor plate, arms and ammunition—any or all the agencies of war.

Turning to the question of alleged excessive profits made by armor manufacturers, Senator Harding said:

"At any rate, the armor plate problem is not to be best solved in prejudice against the men who have succeeded. For myself, and senators will agree, I hope, we ought to settle this question on one explicit issue —what is best for this republic?" He insisted that the people have heard only one side of the question. Rarely, he said, has anybody thought, much less spoken, of the enormous lossess due to obsolescence. Not very many have ever stopped to think, asserted the senator, that federal assumption of the manufacture of armor plate will put out of business and render little more than scrap these great plants, representing approximately $20,000,000 of investment, though these investments were made exclusively to serve the United States government. If the truth were told in the hearings, it was stated, and there is no contradiction, the business has not been half so profitable in these monopolistic dealings with the government as the steel business has been in the commercial world of competition. He said it was natural that the armormakers would not want to make their business secrets public, and, stating they offered to give details as to cost, etc., in confidence, asserted a high public official could allay the public apprehension as to inordinate profits. He thereupon recited figures to show that excessive prices are not being charged the government for armor plate, and showed that every foreign country pays more for its material than does the United States. Going further, he said that the bill, instead of being a measure of preparedness, is one of unpreparedness, and would hinder the government in its program to develop a strong navy. Moreover, he said it is not known that in five years the government would have an effective armor plate plant.

Senator Oliver referred to the ill consideration which had been given to the armor plate question, and to the abuse to which manufacturers

have been subjected. Charges have been so widespread, he said, that they could not help but have their influence on the public mind. Mr. Oliver admitted that until he had investigated the matter himself he had believed some of the charges must be true, but his investigation was declared to have been astounding, showing there was absolutely no foundation whatever for the charges which had been made. He asserted that the government had purchased armor plate at fair prices and defied anyone to prove otherwise, except through supposition.

Scrap Prices Are Higher

In the Pittsburgh District, But General Buying Has Not Followed Purchasing by Steel Corporation

Pittsburgh, March 21.—Most grades of old material have advanced at least 50 cents a ton this week, despite a rather quiet market. Heavy melting steel has been sold at $19, delivered, although the $18.50 quotation has not entirely disappeared. It generally was believed that rather general demand would feature the market after the United States Steel Corporation closed for about 125,000 tons of heavy melting stock a fortnight ago, but requirements of independent manufacturers apparently are fairly well covered.

Brokers in the Market

Philadelphia, March 20.—Bullish interpretation for the future of the recent large purchases of heavy melting steel at higher prices at Pittsburgh and other western points is causing brokers who have uncovered contracts for this grade to come into the market to protect themselves, which they are willing to do at some loss. They are offering $17.50, delivered eastern Pennsylvania, but are not getting much material, as holders are reluctant to sell since they have noted the improvement in the situation. These offers are higher than the mills have paid recently; in fact, there have been no late transactions of size, so that just what the consumers would be obliged to pay for a good tonnage remains an open question.

Some Soft Spots

New York, March 21.—A more healthy condition is shown by the scrap market especially in heavy melting steel and in No. 1 railroad wrought, but there still are soft spots. Steel has taken a move upward and there are offers of $18, delivered eastern Pennsylvania, from consumers which is about $1 higher than they recently have been tendering. The brokers have been bidding against the mills for material to cover their short tonnage. The higher offers from eastern Pennsylvania steelmakers place steel at New York on about the same basis for the former district as has prevailed for Pittsburgh shipment, where $18.75, delivered, is obtainable. Dealers' prices for steel are around $15.50, New York. Not much metal is available, as the market is well cleaned. For No. 1 railroad wrought, $23, delivered eastern Pennsylvania, is offered. Shrapnel turnings are commanding a considerable advance over ordinary turnings because of their lower phosphorus content.

Heavy Rates at Buffalo

Buffalo, March 21.—Large sales of heavy melting steel are being made at $17.50 to $18. Dealers report an active market in a number of the lines and advances of 50 cents a ton in the schedules on a number of the principal commodities handled in the yards of the district. The market presents a situation where some of the dealers are paying higher prices for heavy melting steel and some of the other lines, than they are obtaining on tonnages being delivered to the principal consumer. The latter has been able to secure considerable tonnages or heavy melting steel at the figures quoted above, even though yards are paying a somewhat higher price for their own stocks. It is a case of discounting the market. They are confident that prices shortly are to be considerable higher, in keeping with the advances in all other lines. The arrival of spring, it is figured, will bring a noticable increase in activity all along the line.

Mills Are Not Buying

Cleveland, March 21.—The tension of the past week has given way before the non-committal attitude of the mills toward further purchases. There is some trading between dealers, but little activity among users of scrap material. The recent heavy buying of Pittsburgh interests strengthened the local market considerably and dealers expected a heavy purchasing movement. This did not come and the result has been a slight weakening, but with no trace of price shading. In fact, some material has experienced an upward trend with cast borings quoted at $8.75 to $9, net tons; machine shop turnings, $8.75 to $9, net tons; heavy melting steel, $16.75 to $17, gross tons, and steel car axles, for which there is little local demand, $24.75 to $25.25, gross tons.

Advances at Cincinnati

Cincinnati, March 21.—Another advance of 25 cents per ton has been realized by iron and steel scrap dealers here. The market is very active and prices are strong. Rolling mills continue to ask for heavy shipments on contracts and are also coming into the market at intervals for new contracts. Sales to jobbing foundries are heavier than usual.

Chicago Prices Stronger

Chicago, March 21.—Continued buying by consumers had the effect of advancing quotations on iron and steel scrap somewhat above prevailing levels. Tonnages already contracted are sufficient to cause brokers and sellers to bid comparatively high, for demand has not decreased to an appreciable degree.

Sales Heavy

Birmingham, Ala., March 21.—The old material market has shown decided strength during the past week. Sales have been heavy. One large interest closed for 1,500 tons of No. 1 machinery scrap at $12 per gross ton f. o. b. foundry yards. Prices have been marked up $1 per ton.

More Capacity

Will be Built by Corporation—New Advance in Price of Rails.

New York, March 22. (By wire.)—The United States Steel Corporation has authorized the building of a 12-inch bar mill at Duquesne, to cost $1,500,000, and three more open hearths and soaking pits have been ordered for Farrell. The increase of the Clairton by-product coke plant will be from 200 to 650 ovens.

The Steubenville furnace went in last week. The Corporation now is blowing 110 of 120 furnaces.

It is authoritatively stated by leading rail makers that there will be no advance in price despite the large rise of other finished lines.

James Taylor, formerly in the structural steel business at New York City, died in that city recently.

Making Small Electrical Castings

SCIENTIFIC METHODS may be studied at their best in large continuous foundries which are designed for the production of small castings in wide variety and great quantities. Continuous molding and pouring systems are here efficiently supplemented by mechanical ingenuity in handling and tempering the sand

BY H. COLE ESTEP

IN A foundry arranged to manufacture castings for a complete line of electrical apparatus, from large industrial motors to small household appliances, a great variety of equipment is necessary, including facilities for pit and loam-molding, for large floor work with jar-ramming and roll-over machines and for the rapid production of thousands of small castings weighing from a few ounces up to three or four pounds. For the latter work an elaborate mechanism is necessary, including not only molding machines, but devices for rapidly and economically handling the sand, transferring the hot metal and removing the finished castings. To insure a remunerative output per man per day, every detail of the process must receive intensive study and the problem, therefore, presents an unusually large number of points of interest.

Success in the manufacture of small castings, whether they be for electrical apparatus or for other purposes, hinges largely on the methods adopted for handling materials and for executing the details of molding. The experience of the past few years has demonstrated that continuous molding and pouring, supplemented by effective mechanical appliances for handling and tempering the sand, brings unusual results with this class of work. A large number of continuous foundries of various types, therefore, have been built in this country recently.

One of the latest shops of this character, designed for the continuous production of small electrical castings, is that recently completed in Cleveland by the Westinghouse Electric & Mfg. Co. In this connection it is interesting to observe that the Westinghouse interests were among the first to adopt continuous methods in the United States, in the foundry of the Westinghouse Air Brake Co., Wilmerding, Pa., a suburb of Pittsburgh. This plant, in which the molds are carried to a central pouring station, has been in successful operation for several years. In many respects, however, the Cleveland plant differs from its Pennsylvania predecessor, in that the molds are poured on the floor where they are made and novel arrangements are provided for handling the hot metal, sand and finished castings.

A complete description of the new continuous foundry of the Westinghouse Electric & Mfg. Co. at Cleveland will be presented in an early issue of *The Iron Trade Review*, to which this article, covering the methods of molding certain typical castings, may be considered an introduction. Before going into the details of molding, however, it is necessary to present certain facts regarding the arrangement of the shop.

All the work is handled on molding machines which are arranged in two rows along either side of the shop. A small floor is provided for each machine on which the finished molds are placed; the work, however, is poured and shaken-out practically as fast as it is made.

The molds are shaken-out over a grating in the floor, through which the sand passes to a conveyor belt beneath. This belt delivers the worn sand to a central screening and tempering station, where it is mixed with the requisite amount of new sand for use again.

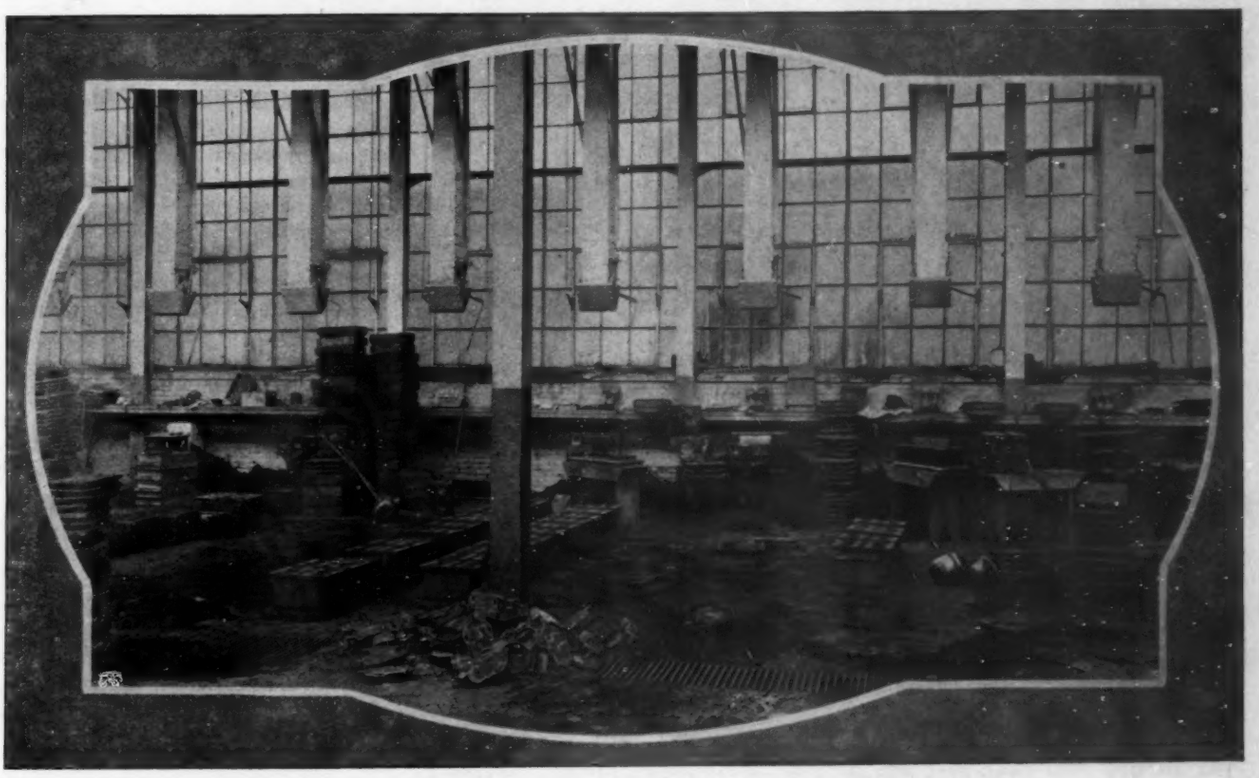


FIG. 1.—A TYPICAL SECTION OF THE WESTINGHOUSE CONTINUOUS FOUNDRY IN CLEVELAND, SHOWING ARRANGEMENT OF SAND CHUTES, MOLDING MACHINES, SHAKE-OUT GRATINGS, ETC.

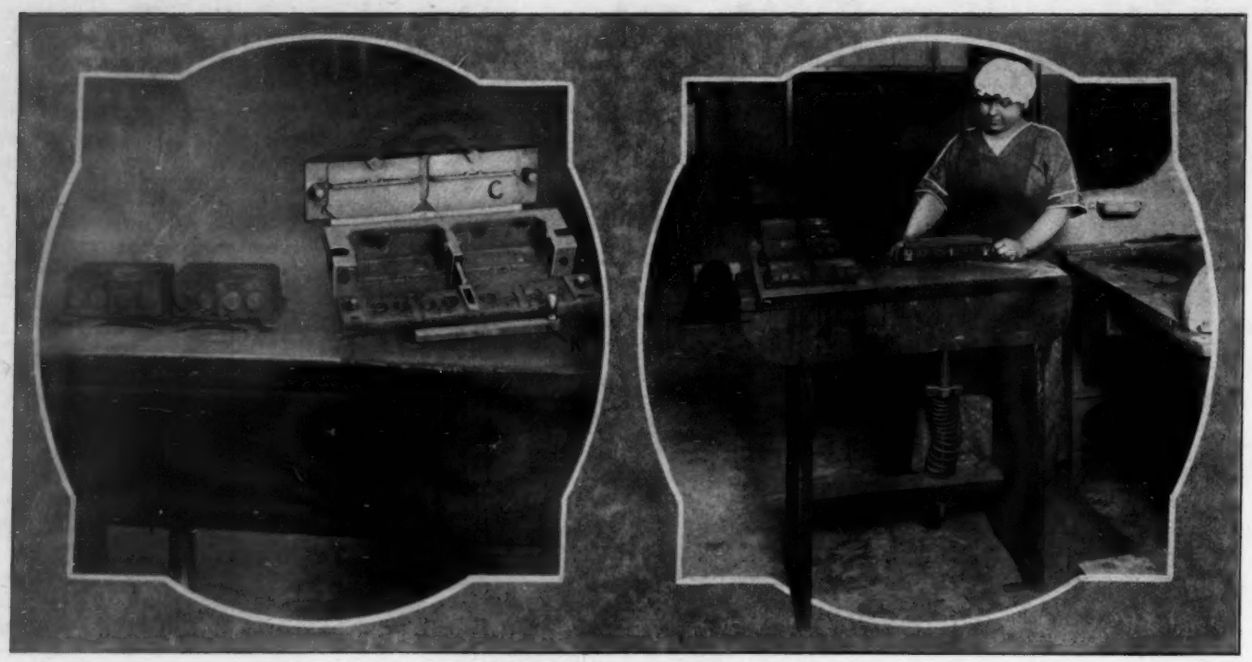


FIG. 2.—DETAIL OF CORE BOX—TWO FINISHED CORES ARE SHOWN ON THE DRIER PLATE AT THE LEFT

FIG. 3.—STRIPPING TERMINAL-CHAMBER CORES OUT OF THE BOX

The prepared sand, which is handled by a system of elevators and belt conveyors, is delivered to chutes placed over each molding machine. A typical floor showing the arrangement of the molding machines, sand chutes, shake-out grating, etc., is shown in Fig. 1. The men at the machines have practically nothing to do but mold; the sand is delivered direct to their flasks, ready for use, and the work is poured and shaken-out by a separate gang. The iron is melted in three Whiting cupolas, 54 inches inside diameter, rated at 12 tons per hour each. The hot metal is delivered to the floors by an electrically-driven, cab-controlled telpher furnished by the Brown Hoisting Mchy. Co., Cleveland. The castings are removed to the cleaning room in suitable buggies.

This foundry turns out a great variety of work, including such castings as resistance grids, small motor frames and house meter cases and frames. From a molding standpoint, the latter present certain features of interest, which it is now proposed to describe in some detail.

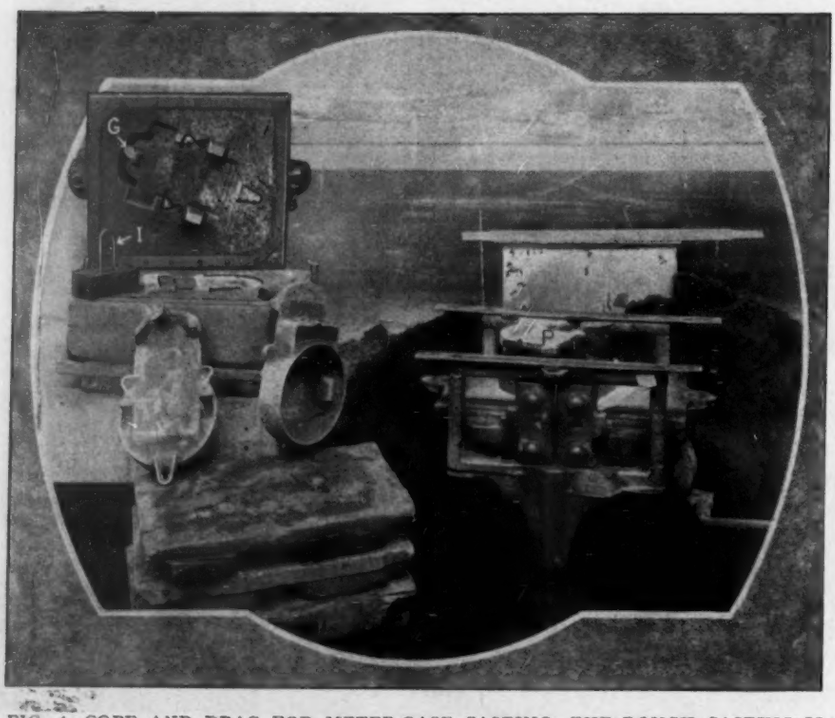


FIG. 4—COPE AND DRAG FOR METER-CASE CASTING—THE ROUGH CASTING IS SHOWN IN THE FOREGROUND AND THE DRAG STRIPPING-PLATE MACHINE AT THE RIGHT

In the manufacture of Westinghouse single-phase alternating current watthour meters, such as are used in stores and residences for measuring electrical energy, two light gray iron castings are required, a case or back and a frame carrying the moving parts. The cover, which fits into a recess in the case, protecting the mechanism from injury, is made either of pressed zinc or glass.

The case, shown in the rough in Fig. 4, weighs about 3½ pounds finished and has an average metal section of ⅛-inch. It is necessary that it be strong, rigid and dust-proof, as well as accurately molded in order to have a suitable finish and to avoid machining. The meter case proper and the accompanying terminal chamber, into which the wires connected with the outside circuits are led, are cast integrally, separated by a 1/16-inch wall.

This design, while producing an advantageous product from a commercial standpoint, adds to the difficulties of the foundryman.

Green Sand Core

The core forming the interior of the case is made in green sand, the terminal chamber being formed by a dry sand core that must be very accurately made and set. The casting is molded on stripping plate machines furnished by Henry E. Pridmore, Chicago. These machines are provided with a 3¼-inch draw.

The dry sand, terminal-chamber core, which is shown in Fig. 2, must be accur-

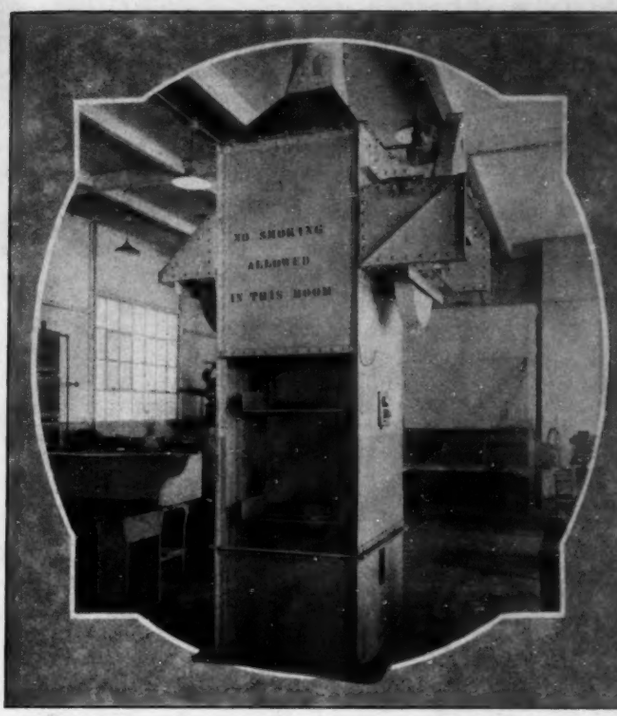


FIG. 5—ELEVATOR FOR TRANSFERRING GREEN CORES TO OVENS ON FLOOR BELOW—THE SAND BINS ARE SHOWN IN THE BACKGROUND

FIG. 6—A SECTION OF THE COKE-FIRED, DRAWER TYPE OVENS USED FOR BAKING SMALL CORES—EACH OVEN HAS SEVEN SHELVES

ate to 0.01-inch and must fit without filing. Also, since a complete 5-ampere meter is listed at only $19.50, the cores, molds and castings must be turned out with the utmost economy and in large quantities. The terminal-chamber cores, therefore, are made by semi-skilled girls in a specially equipped, separate core room. To insure accuracy, carefully machined metal core boxes are provided, together with special rigging that permits five girls to turn out 4,000 good cores a day. The girls' core room is situated on a mezzanine floor directly over the ovens and sand mixing apparatus. The sand, ready for use, is delivered to bins in the core room by an elevator, another elevator being used to carry trays of finished cores to the ovens. Each girl transfers her own sand from the storage bin to her bench.

Core Handling Methods

The benches are arranged on both sides of the room with the finished-core elevator in the center. The sand bins are at one end. As fast as each girl finishes a tray of cores, she places it on a table near the elevator, from which it is transferred to the elevator, which is of the pan type, by another employe detailed for that purose. The coremaker therefore, does not have to waste time waiting for an opportunity to load her particular tray onto the elevator.

A detailed view of the core, drier-plate and core box is shown in Fig. 2. It will be noted that two cores are made at one time. Each core is 4 inches long, 2½ inches wide and 1½ inches thick. The form is rectangular, with a circumferential groove forming a stiffening rib on the inside of the casting. The core box, which is 11 inches long, 3½ inches wide and 2½ inches deep, is made in three parts fitted together by machined pins. The front of the box, which is held in place during the ramming operation by the key *K*, Fig. 2, forms four circular bosses on the core. These bosses serve to reduce the thickness of the metal, forming knock-out plates through which the wires enter the terminal chamber of the meter. If it were not for these bosses, it is plainly evident that the core box could be constructed in two parts.

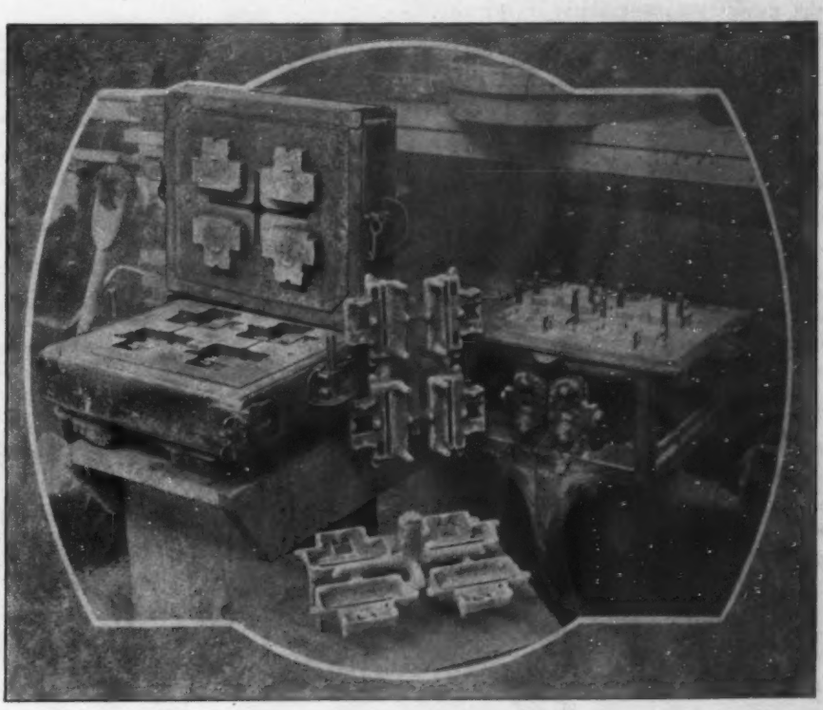


FIG. 7—FLASK CONTAINING FOUR METER FRAMES—THE DRAG-MOLDING MACHINE IS SHOWN AT THE RIGHT

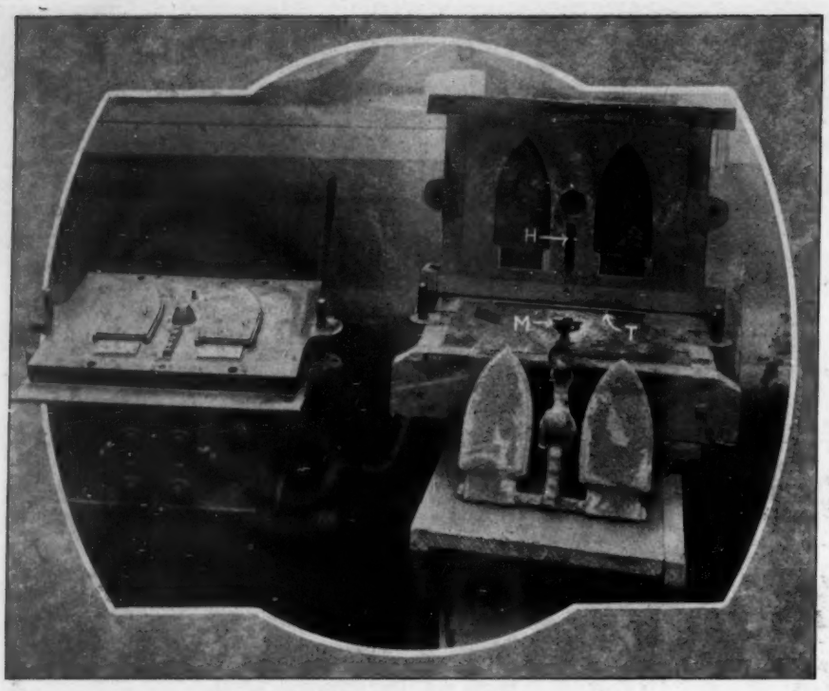


FIG. 8—MOLD FOR ELECTRIC FLAT-IRON BOTTOMS, SHOWING PECULIAR GATE PROVIDED WITH DRY-SAND SKIMMING BRIDGE

After the core is rammed up and the cover-plate *C* removed, the box is rolled over and placed on the draw-bench shown in Fig. 3. This bench is provided with a stripping plate through which the core is lowered out of the box, the operation being performed by pressing the foot treadle with which the bench is provided. This produces a core with square sides, practically no allowance for draft being necessary. Fig. 3 also shows the general characteristics of the core-maker's benches, which are simply constructed with cast iron legs and wooden tops. Each bench is provided with a drawer for small tools, etc. With this equipment, a girl after reasonable training, can easily turn out 900 meter-case, terminal-chamber cores in a day.

A normal mixture of fine sand, glutrin and dry core compound is used for making the cores. The sand, which is as fine as can be obtained, is riddled through a No. 4 screen.

Fig. 5 shows the core elevator mentioned previously, with a tray of finished cores ready to be sent to the oven on the floor below. The sand bins and discharge-end of the sand elevator are shown in the background in this illustration. The core elevator is driven by a motor through enclosed gearing. It is also provided with a 12-inch diameter ventilating flue through which odors given off by the cores are removed.

The cores are baked in a seven-section, drawer-type, coke-fired oven furnished by the Coleman Foundry Equipment Co., Cleveland. As shown in Fig. 6, each section is equipped with seven drawers, the outer ends of which are supported by a four-wheel trolley running on channel beams. The discharge end of the core room elevator is placed so that it is convenient to all of the oven sections, the average transfer distance being 12 feet. The trays of green cores are shifted from the elevator pans to the oven sections by a man detailed for that purpose.

The meter cases are molded in snap flasks, using Pridmore stripping plate machines. The men work in pairs with two machines for each floor, one man making copes and the other drags. The man who makes the copes also transfers the finished molds from the bench to the floor and distributes the pouring weights. The details of the mold, together with the drag machine and rough casting, are shown in Fig. 4. The flask is 11 x 13 inches inside measurement, the cope being 3 inches and the drag 4 inches in depth. The man who molds the drags is semi-skilled and is held responsible for the success of the work.

The pattern, as shown in Fig. 4, is of metal. When the pattern is stripped-out of the drag mold, the heavy green sand core forming the interior of the meter case, is prevented from dropping by the plate *P*, which remains stationary.

The metal is poured through a single runner which connects with the terminal-chamber end of the casting through a bifurcated gate shown clearly at *G*, Fig. 4. There is no riser. Formerly two castings were made in the flask, but it was found difficult to avoid chilling. Special difficulty was experienced in running the thin circular rim of the casting. Since the present method of making one casting in the flask was adopted, this difficulty has been overcome entirely.

The dry sand, terminal-chamber core must be set accurately and for this purpose the wire clip *I*, Fig. 4, is provided. The use of this clip makes it easy to set the core in exactly the right position. After the casting is made, the thickness of the walls of the terminal-chamber is tested with a gage and a core displace-

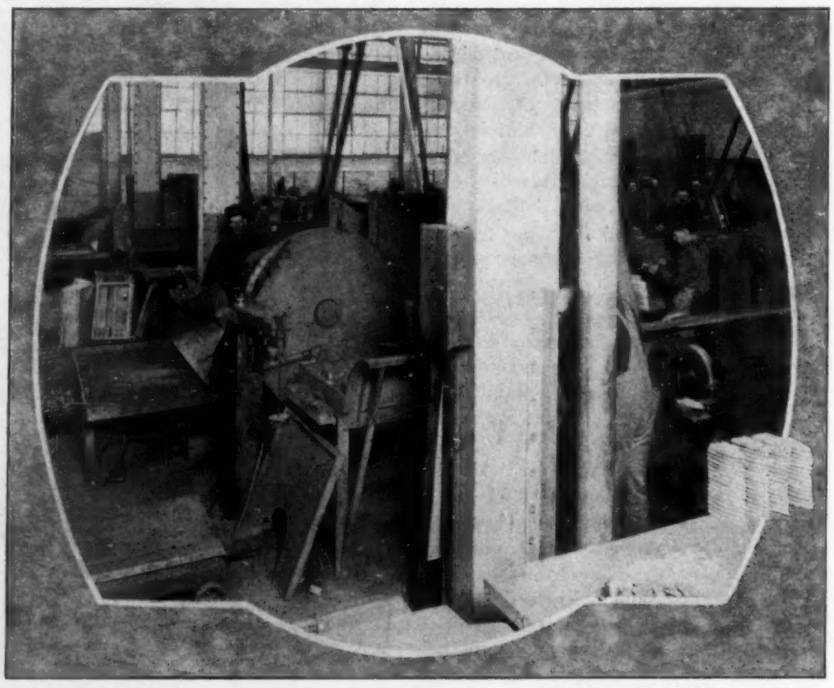


FIG. 9—A PORTION OF THE GRINDING ROOM, SHOWING CONVEYOR FOR DISCHARGING FINISHED CASTINGS ON THE SHIPPING PLATFORM

ment of 1/32-inch is sufficient cause for rejection.

Fig. 1 shows how the floor is arranged, the molds being provided with jackets and weights for pouring. As mentioned previously, the castings are shaken-out over the gratings shown in the foreground in this illustration. A number of fresh castings, awaiting the arrival of the cleaning-room buggy, are also shown around the post in the foreground of Fig. 1. These castings are made from an ordinary light gray iron mixture running about 2.50 per cent silicon. The metal is poured extremely hot in order to avoid cold-shorts and to produce a properly finished casting.

The method of molding the cast iron frame which supports the moving parts of the meter is shown in Fig. 7. These frames fit into the cases previously described. Four castings are made in a 12 x 14-inch snap flask. The copes and drags are each 3½ inches deep. As in the case of the meter cases, each floor is provided with two stripping plate machines, one for making copes and the other for forming the drags. The main cores, which are green sand, are suspended from the cope. The method of gating the castings is shown very clearly in Fig. 7. A single runner terminating in a four-way channel is used. Each casting, therefore, is gated at two points, insuring the quick and complete filling of the mold. There is no riser. Two men turn out about 250 of these molds per day, giving a total production of 1,000 castings.

The shelf on which rammers, riddles, bottom-boards, etc., are stowed is shown in the background of Fig. 7. This shelf consists simply of two stringers supporting a coarse wire screen through which the sand filters. The shelf runs the entire length of the shop, serving every molding floor.

Molding Flat-Iron Plates

Fig. 8 shows the method of molding bottom plates for electric flat irons. The stripping-plate machine used for molding the copes is shown at the left of this illustration. Two castings are made in each mold, a 10 x 14-inch snap flask being employed. The cope and the drag are both 3½ inches in depth. It will be noted that the castings are run entirely in the cope, the drag containing nothing but the gate which is provided with a skimming bridge furnishing clean metal. The runner is located in the center of the mold and after the metal passes under the skimming bridge, which is formed by a dry sand core, *M*, Fig. 8, it passes through the channel *H* in the cope, the lower or rear end of which connects with the double-ended gate *T*. The gate extends almost entirely across the back of the casting, filling the mold very quickly.

The rough castings are transferred to the cleaning and grinding department for finishing. A portion of this department is shown in Fig. 9. It is equipped with 20 tumbling mills, in which the castings are rattled before being trimmed on the grinding wheels. The men in the foreground of Fig. 9 are grinding flat iron castings. Each wheel is provided with a hood, connected to a powerful dust exhaust system, which keeps the atmosphere in the grinding room almost perfectly clean. The photograph from which Fig. 9 was made was taken instaneously while the plant was in full operation and the absence of dust is self-evident.

As fast as the castings are ground they are dropped onto a slowly moving conveyor placed between each double row of machines. This conveyor discharges the finished castings onto a receiving table shown at the left in Fig. 9, from which they may be transferred directly to outgoing railroad cars nearby.

Many Developments in Virginia District

DURING the past two years the Oliver Iron Mining Co., a subsidiary of the United States Steel Corporation, has been developing a number of new underground mines in the Virginia district of the Mesabi range, Minnesota. This new work, coupled with the operation of several of the older properties in the territory, served to make the Virginia district one of the most active in the Lake Superior iron ore country in 1915.

One of the most important mines near Virginia is the Alpena, a combined open pit and underground property. It was in full operation during the season of 1915. Work in the open pit was commenced for the season in April, no stripping having been done during the winter of 1914-15. Two steam shovels were operated throughout the shipping season and pit operations were completed in November. This practically winds up the open pit work on this property, but the company expects to mill out about 475,000 tons during 1916. The milled ore will be hoisted through No. 2 shaft and an inclined hoist will be placed in the pit to handle rock.

The workings in connection with No. 1 shaft, Alpena mine, have been operated continuously. Stockpiling ceased in April, 1915, and commenced again in November, 1915. The ore is won by the cave-stoping method. No mining operations were carried on through No. 2 shaft during the past season, but the 170-foot level was cut out by operations in the pit. The main level is being retimbered for milling operations in 1916. In No. 3 workings a main tramming level has been cut from the outside arena and the ore formerly stockpiled in the pit was shipped direct during the past season. A loading trestle was installed near the mouth of the main level opening for this purpose. At the present time, with navigation closed, the ore from these workings is being stockpiled on the Sauntry property.

Among the new mines controlled by the Oliver Iron Mining Co. in the Virginia district are the Sullivan, Wanless, Shiras, Deacon, Prindle and Ordean. The Sullivan, which was opened in 1913, was closed down in March, 1915. The buildings, headframe, etc., were removed from the premises and the lease surrendered.

Seven sub-levels were opened on the Wanless property during 1915 and shipments were made during the entire season. Stockpiling commenced in November. This mine is now being operated at its maximum capacity in anticipation of large shipments during 1916. In the Shiras mine, four sub-levels have been opened up and shipments were made during the entire season of 1915. At present some ore is being forwarded to the Duluth works of the Minnesota Steel Co., the remainder being stockpiled. This mine is also being operated at maximum capacity. Ore was reached on the main level of the Deacon mine in February, 1915. The main sub-level was cut 50 feet above the main level and stoping commenced in April. Three sub-levels have been opened up and shipments continued until the close of the season. Ore is now being stockpiled and the mine is working to capacity.

At the Wanless, Shiras and Deacon properties the change houses are being enlarged in order to take care of the additional forces of men employed. The drys at the Shiras and Wanless mines are built of concrete block. At these two mines, also, additions are being made to the engine house to accommodate motor-generator sets which will be used for the purpose of electric tramming underground.

The Ordean mine contains a small body of ore located north of the Sliver property controlled by M. A. Hanna & Co. Stripping operations were commenced in October, 1915, and are still in progress. About 600,000 cubic yards of overburden will be removed and it is expected that the mine will be placed on the shipping list in 1916.

The old Missabe Mountain property, which had 353,133 tons to its credit up to Jan. 1, 1915, was reopened in May. Ore was shipped from old stockpiles originally placed on the property and from the open pit; the work continued until the close of the shipping season. No further stripping operations were conducted. The Prindle mine, a new open pit property, was operated only during October, 1915, and 24,000 tons were shipped. The Prindle property fee is owned by the state of Minnesota.

High Sulphur Steel Deserves Research

BY M. H. SCHMID

IN A PAPER entitled "An Investigation of the Effect Produced by Varying the Sulphur Content of Basic Open Hearth Steel", presented by Dr. J. S. Unger at the recent annual meeting of the American Society of Automobile Engineers, the author concludes from the results of a series of tests that steel containing less than 0.100 per cent sulphur is not necessarily bad.

Dr. Unger carefully qualifies his statement by the words "not necessarily bad." This brings up the point as to when steel is bad and when it is not. Granting that steel of such high sulphur content is satisfactory, a large percentage of the time, how would the consumer be able to ascertain, before using, which stock is satisfactory and which is unsatisfactory? Surely a chemical analysis would not enlighten him. Neither would a solution of the matter, such as would be possible through microscopic examination, prove practical and commercial. On the other hand, the consumer could not afford to work up material with the idea of separating the good from the bad after processing.

In the tests made by Dr. Unger sulphur additions were made in the pure powdered form to the ingots during pouring, the ingots being poured from heats from which the original impurities had been worked down to a point considerably lower than the prevailing commercial limits. The question arises as to what difference should be expected between high sulphur steel in which the sulphur exists as an unremoved impurity originally existing in impure raw materials, which are not sufficiently worked to be purified; and high sulphur steel, on the other hand, in which the impurities are greatly reduced, through excellent melting conditions, and in which high sulphur exists owing to additions to the previously purified metal.

In Dr. Unger's tests, but 50 tons of steel out of 100 tons cast were used for specimens. A natural assumption would be that the stock was practically all taken from the lower half of the ingot. On this basis, Dr. Unger's tests were made from a product with not less than 50 per cent croppage, which would be considered as a selected grade and not typical of commercial practice.

An investigation of the form in which the sulphur exists in the steel, and of its distribution, is of considerable importance. Without doubt, in these tests the formation of sulphides was such that the properties of the metal were least affected. Further investigation with the microscope would be welcomed. Before sanctioning the commercial use of high sulphur steels it seems necessary to complete a long line of research work, beginning where Dr. Unger left off. First, it is necessary to determine in just what condition the sulphur may exist without exerting deleterious effects on the properties of the metal. Second, after ascertaining this condition, it is necessary to perfect melting conditions in the steel plant, such as will enable the commercial attainment of this condition, as well as the production of metal with high sulphur so combined that its presence will not be harmful under most adverse conditions in any heat. Until the steelmaking process has reached such a degree of advancement and perfection, we cannot see, from the consumer's standpoint, the justification of inflicting upon him high sulphur steel, although from the steel manufacturer's standpoint it would doubtlessly be an advantage in offering a means of working up high sulphur raw materials.

The author of this discussion is metallurgical engineer, United States Steel Co., Canton, O.

Iron-Silicon Alloys

"Magnetic and Other Properties of Iron-Silicon Alloys, Method in Vacuo," by T. D. Yensen has been issued as Bulletin No. 83 of the Engineering Experiment Station of the University of Illinois. This bulletin describes methods employed in producing a number of iron-silicon alloys which the author has subjected to mechanical and electrical tests.

It is shown that silicon increases the mechanical strength of iron in almost direct proportion to the amount added, until the maximum strength is reached with a silicon content of about 4.5 per cent. The elastic limit of this alloy was shown to be 94,000 pounds per square inch and its ultimate strength 105,000 pounds.

With regard to magnetic properties the vacuum alloys are shown to possess most remarkable characteristics. The maximum permeability is above 50,000 and the hysteresis loss is only one-eighth to one-third of that for commercial silicon steel. The specific electric resistance increases about 11 microhms for each per cent of silicon.

Methods of Quenching Steel

At a recent meeting of the Huddersfield Engineering Society, Shipley N. Brayshaw discussed the properties which determined the value of any liquid as a quenching medium, and pointed out that the main items of consideration in this direction were specific gravity, specific heat, boiling point, conductivity and fluidity, and gave some interesting information in connection with experiments which he had carried out in the hardening of tools in various ways, and by means of various quenchers.

He described the effects of stirring the quenching medium, and also the use of jets for throwing a strong stream against the articles to be cooled, and also referred to the use of brine and freezing mixture of snow and salt. The uses of oil, mercury, fusible oils, and fusible salts as quenching media were dealt with, and the lecturer laid down as the ideal medium for quenching, one which was from fluid at 100 degrees Cent., at a high boiling point of practically 800 degrees Cent., fairly high specific gravity, and of fairly good specific heat. This would give a glass-like hardness to the tools.

Moving Big Ore Unloaders By Water

ENGINEERING problems of a novel and interesting character were recently solved by the engineering staff of the Pittsburgh & Conneaut Dock Co., Conneaut, O., when the accession of new equipment made it necessary to transport four Brown 5-ton electric ore unloaders from the company's No. 4 dock to its No. 2 dock, across the harbor slip and about 3,000 feet south of the former position. As shown in Fig. 1, the original equipment of No. 4 dock included the Brown machines, four Hulett 10-ton hydraulic unloaders and one 17-ton Hulett electric unloader. Having purchased two new Hulett 17-ton electric machines, and desiring to keep the units of each type together as far as possible, the company decided to erect the new machines on No. 4 dock in place of the Brown machines, making room for the latter on No. 2 dock by dismantling some of the older equipment. This operation involved turning the unloaders about en route so as to face east instead of west, as formerly.

The feasibility of moving the machines to their new position by rail was first considered by P. J. Fickinger, chief engineer, and his associates. This proved out of the question, the machines in their original form being too wide and high to go under the swing bridges which had to be negotiated. It appeared equally inadvisable to cut the unloaders down and re-erect them on the new site, as the cost of cold cutting and re-erecting, with the ensuing duplication of falsework and incidental staging, etc., would have more than doubled the cost of erecting new equipment. It was at length decided to move the machines by water. This idea was suggested to Mr. Fickinger by his recollection of floating bridge spans, erected on barges, into place on the Ohio river at Pittsburgh. This feat, he declared, was accomplished on a navigable stream in New Zealand more than 30 years ago.

The use of two wooden barges, each of 1,200 tons capacity, was secured from the Coast & Lakes Contracting Corporation. These were of the derrick scow type, 200 feet in length and 41 feet beam, with a 20-ton derrick at either end. The problem of getting the machines on and off the barges without straining the structural work now presented itself. The flexibility of the unloaders' construction made the task especially difficult. Inasmuch as the track on which they were operated ran parallel with the face of the dock, while their removal involved moving them at right angles to the dock, it became necessary to devise a new means of transporting the bridges to the barges. Mr. Fickinger and his associates at first planned to build a tramway with rollers; but this plan was abandoned, owing to the danger of the rollers imparting severe and constantly varying stresses to the structures. A scheme of using skids to slide the machines into place on the barges was likewise given up on account of the danger to which the fabric would be subjected by the severe stresses generated by the sudden and radical changes from a high static friction to a low moving friction load, causing the structure to move by jerks.

In order to move the unloaders onto the barges with the least friction, and to adjust the inevitable stresses under the principal members in the same manner in which they were designed to be stressed in service, a new set of four-wheeled, partially equalized trucks, equipped with universal joints, was designed and built by the dock company. These trucks took the place of the

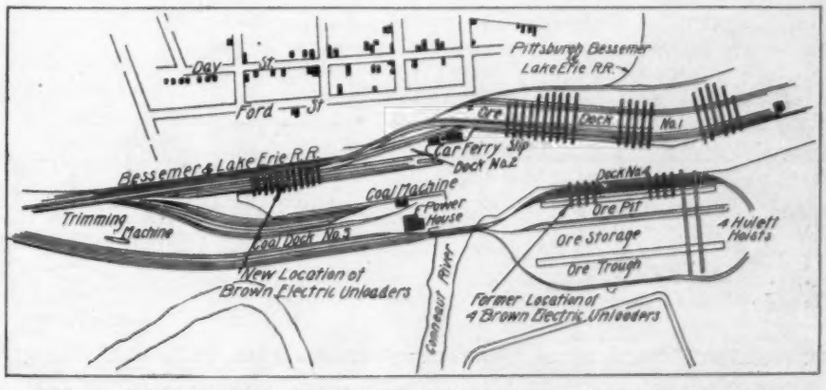


FIG. 1—PLAN OF SLIP AND DOCKS SHOWING FORMER AND PRESENT LOCATION OF UNLOADERS

FIG. 2—UNLOADERS ON BARGES SHOWING FALSEWORK

FIG. 3—MACHINES NEARING THEIR DESTINATION

trucks originally supplied with the machines, facing, of course, at right angles to the previous axis of operation. Their construction is illustrated in Fig. 5, and they may be seen in use in Fig. 2.

The next problem was that of securing the maximum amount of stability possible with the dimensions of the machines. As these measured 98 feet in height over all, with a width of 24 feet and a total length, excluding the cantilever, of 62 feet 10 inches, it was decided to couple two machines together so as to handle them in pairs. This gave a total wheelbase, for each pair, of 48 feet. The cantilevers were removed and the machines linked together by means of 10 x 16-inch Douglas fir sills and 12 x 12-inch Douglas fir caps bolted together as illustrated in Fig. 2, which also shows the method of cross bracing by means of steel tie rods.

In order to stabilize the two barges, as far as possible, and to provide adequate room for handling the machines, they were lashed together, the aprons and cantilevers of the unloaders being utilized for strongbacks across their decks. With the barges separated by a distance of 18 inches, timbers 12 inches square were passed underneath at bow and stern. Bolts were then passed through the aprons, down between the barges, and through the timbers beneath, locking the barges together. Five wraps of 1⅛-inch cable were then fetched around the two barges at either end. This cable was drawn taut, the tension upon it being increased by means of wedges.

Some Difficulties Surmounted

Extreme care was required to properly secure the barges to the dock, in order to receive the load without causing a pronounced list in the barge nearest the dock. Another point to be considered was the fact that when most of the weight of the machines, representing nearly 150 tons each, was on the barges, their after ends still remaining on the dock, the stresses were reversed.

Again, when the unloading machines were completely drawn onto the barges, the load on the extreme outer edge of each would tend to cause a reciprocal outward list. This was forestalled by blocking under the central post shown at *A* in Fig 2, thus distributing the strains more equably and bringing both barges onto an even keel, with increased stability. The unloaders were successfully drawn aboard the barges over a carefully prepared track, the inequality in height between the barges and the dock being adequately cared for by the universal joint design of the trucks, into which the legs of the machines fitted, equalizing all stresses. In moving the machines, a hoisting engine equipped with suitable blocks and falls was utilized. One tug was employed in towing the machines to their new destination, this operation including winding the unique craft in mid-channel, so that the unloaders would face east instead of west when landed.

The unloaders were drawn ashore by methods practically a replica of those used in the embarkation, and were placed on previously constructed foundations. Fig. 3 shows the machines nearing the new site, as well as the tracks over which they were hauled to the foundations. Only one day was consumed in moving each pair of unloaders from their original position to the permanent location.

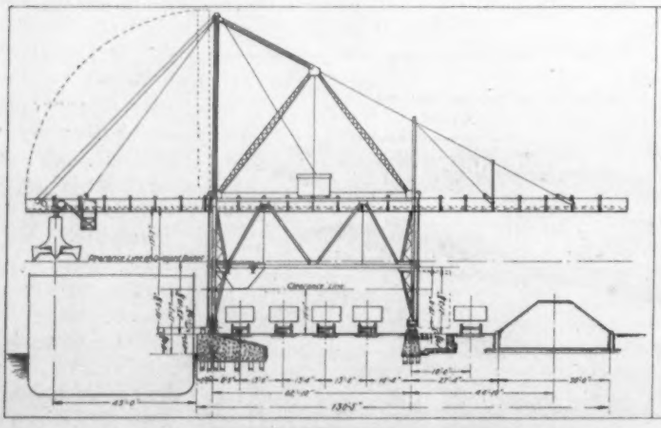


FIG. 4—PLAN OF BROWN ELECTRIC UNLOADING MACHINE

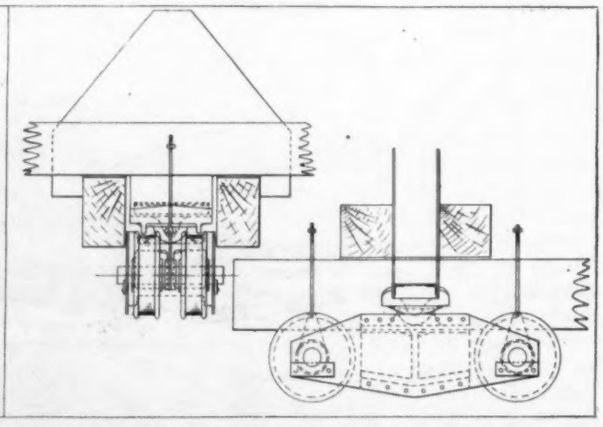


FIG. 5—SPECIAL TRUCKS DESIGNED FOR MOVING UNLOADING MACHINES

Scientific Management in Arsenals

OFFICERS in the ordnance department of the federal government are attempting to conduct the arsenals in accordance with the principles of scientific management. This article describes the introduction of the Taylor system at the Watertown arsenal, and the subsequent attempts of organized labor to oust it

BY GEN. WILLIAM CROZIER

THE Taylor system of scientific management, which is the one we have partially installed in the ordnance department, and in pretty full practice at one of the arsenals, can be divided into two general parts. The first part relates to the systemization of the processes of manufacture so that these processes shall be carried on in a perfectly orderly manner. Of course there is nothing new in systemization, since all persons connected with the management of industrial establishments have been giving attention to the system and order with which the work of establishments should be conducted. The new thing for which we are indebted to Mr. Taylor is the realization of the degree of attention which it is worth while to devote to this subject, and of the amount of time, energy and money which can profitably be expended in connection with it.

In the year 1909 the inauguration of the Taylor system of scientific management was commenced at the Watertown arsenal in Massachusetts. The arsenal has a foundry, a forge shop, a machine shop, a pattern shop and a laboratory.

Organized Labor Objects

At the Rock Island arsenal, in Illinois, one of the first new features to be introduced was the job card. It carries the name of the workman to whom it is given, a statement of his particular job, the time of its commencement and completion, the rate of pay of the workman, and a few items of information with reference to inspection, etc. The principal object of the card is to enable the cost division to charge the cost of the job to the proper order. There was very strenuous opposition to the introduction of this card at the Rock Island arsenal upon the part of organized labor. The opposition did not abate when it was explained that the object of the card had nothing to do with any efforts which the workmen expected to make, nor with the compensation for them, but was only intended for the purposes which I have described. Representatives of the opposition demanded that there should be a promise that the features of the Taylor system which do directly affect the workman should not in the future be adopted at that arsenal. The opposition was not yielded to, but after full explanation the use of the card was insisted upon, and it was duly introduced and has been in operation ever since. The cessation of the opposition may be taken as a tacit admission of a mistake upon the part of the opponents, and therefore to their credit.

Stimulating Features

The second part of the system relates to the quantity of output which may be expected from the workman, and to the stimulus offered him for coming up to the expectation, or for measurably approaching it. As practiced by the ordnance department, it is represented by the features of time-study and premium-payment. The Watertown arsenal is the only establishment in the government service at which the combined features of time-study and premium-payment have been installed and practiced.

After about two years of systemization the time-study and premium-payment features were introduced at the arsenal, commencing at the machine shop, in 1911. There was no opposition or objection. The workmen to whom these features were applied appeared to be interested in them, to be content to work under them, and to enjoy the premiums earned. There was the usual experience of great reduction in the cost of work and in the time required for its completion, and a substantial increase in the earnings of the men, accompanied by no complaint of overwork. Later experience has borne out early indications; great economy and substantial benefits to the workmen have continued.

After two or three months of successful use of the time-study and premium-payment system in the machine shop, it was decided to extend it to the foundry, and upon an attempt to introduce it there the molders went out in a body. They, however, returned to work almost immediately upon an investigation being ordered by me, without condition, and, pending the investigation, the inauguration of the new features was proceeded with, again with the usual results of advantage both to the government and the employes. In the meantime, organized labor had taken alarm, and had issued a strong circular in opposition to the introduction of the system in government establishments, and otherwise commenced active opposition, which still continues.

The agitation resulted in the appointment of a special committee of the house of representatives to examine into the subject; and here is exhibited the peculiar kind of difficulty which is encountered in the government service. In civil establishments the principal weapon of organized labor is the strike, and upon the successful use of it depends the power of labor organizations to carry their points, after failure of attempt at agreement with employers. I do not fear the strike in government establishments. The strike in the foundry at the Watertown arsenal proved a trifling affair. I doubt the power of labor organizations to hold their members out of the government employ, against the advantages which that employment offers.

The Political Weapon

In the government service organized labor has another weapon, which is its political power. As a rule those holding elective office in keen competition with rivals have a wholesome fear of organizations among their constituencies. The political power of organized labor, or the apprehension of such power, does not need any demonstration. The special committee of the house of representatives spent a portion of the winter of 1911-12 investigating the practice of the Taylor system at the Watertown arsenal; but otherwise than as may be gathered from the three volumes of testimony which are printed, the committee did not include in its report any statement

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An address delivered before the Philadelphia School of Commerce and Accounts. The views expressed are not in any way to commit the War Department, which is aware of what has been done in the arsenals of the Ordnance Department, but has not taken any final position in regard thereto. Gen. Crozier is Chief of Ordnance, United States Army, Washington, D. C.

of the conditions as it found them at the Watertown arsenal and of the conclusions which should be drawn from them. The committee recommended that there should be no legislation upon the subject of scientific management in government establishments at that time.

Since the investigation by the special committee of the house of representatives, the practice of scientific management has gone on at the arsenals about as it had before except that the systemization has progressed and become more extensive. The time-study and premium features, in combination, have been introduced at no other arsenal than Watertown, but they have continued in practice at that place. The course of events has been marked by the introduction of bills in congress prohibiting the contested features of the system. Hearings by the committee on labor of the house of representatives have been held upon the subject of the bills, and reports favorable to the passage of the bills have been submitted to the house by this committee, and to the senate by the committee on education and labor, while petitions for the abolition of these features have been forwarded to the war department by committees of the employes at the Watertown arsenal, in some cases signed by many of the employes themselves.

The evidence offered external to the arsenal by these bills, reports and petitions would indicate a state of extreme discontent existing at that place, produced by an oppressive system against which the employes might be expected to revolt violently at any minute; while the internal evidence at the arsenal itself has been of a state of the utmost harmony and good feeling, with cordial co-operation, industry and suggestiveness, accompanying good working conditions; which has produced economical manufacture and increased earnings.

The reports of the committee on labor of the house and of the committee on education and labor of the senate are directly in favor of the abolition of the efficiency features, but none of these bills have arrived at a stage of consideration upon the floor of either house. Some of the conclusions of the reports are very curious, one of them, for instance, says that the claim of increased earnings for the workmen was shown to be unfounded, and that as a matter of fact wages were reduced. This conclusion was worked out by showing that if a man did 2½ times as much work under the premium system and received only 33 1-3 per cent more pay, his pay per unit of work must have been less, which the committee called a decrease of wages, notwithstanding the fact that under this kind of operation a $3-a-day man would earn $4 in the same length of time.

Two petitions, which can be taken as typical, were submitted in the summer of 1913. The first complaint is the one which is most commonly made against scientific management, which is charged with the special object of substituting low-grade workmen, trained to do some single thing and paid for output at a higher rate than unskilled laborers but at a less rate than the skilled men whom they are designed to replace, for the skilled craftsmen, to the detriment of the latter's trade. I deny that this substitution is a special process of scienific management. I wish to state that at the Watertown Arsenal the charge that low-grade workmen are favored in premium opportunities at the expense of those of higher grade is not sustained by the facts. High-grade machinists receive $3.52 per day, low-grade machinists receive $2.56 per day, while certain machine operators receive $2.40 and $2.24 per day. During a certain period for which the records were easily available, there was paid the high-grade machinists increased earnings in premiums of $426.14 each, which was equivalent, for each of them, to 121 days' pay. During the same period there was paid to the low-grade men—the $2.56 per day men—a sum averaging $144.44 each, amounting to 56 days' pay. It is thus seen that the high-grade machinists were very much more fortunate than those of the lowest grade. During the same period there was paid to the $2.40 and $2.24 per day machine operators sums amounting respectively to $49 and $14 for each; so it seems that these men, who are of the class whose work is mentioned as being frequently substituted for that of high-grade machinists, not only did not fare as well as did the high-grade machinists, but came out more poorly than even the low-grade machinists.

Another complaint, that all machinists do not have equal opportunities for earning premiums, may have some foundation. Some jobs do not lend themselves readily to time-study, either because of their character, or because of the fact that they are not to be repeated. The management tries to give all employes some chance at premium jobs, and when a man does not get a chance, his pay suffers no dimunition as compared with what it has been, or with that of similar workmen in the vicinity. In its essence, the complaint amounts to one of two little premium system, instead of too much. As to the complaint that the time allowed is too short for the performance of the jobs which are assigned, it can be met by the statement of the actual result in earnings. The commanding officer of the Watertown arsenal in his report for the month of May, 1915, showed that the premiums paid for that month range from practically nothing to $49.08. The percentage of extra compensation earned by all of the men on premium jobs while so working, on the average, was, in the foundry, 28.13 per cent; in the machine shop, 24.02 per cent; by machinists' helpers, 24.2 per cent; by laborers, 32.53 per cent; by teamsters, 31.33 per cent; by blacksmiths, 17.86 per cent; by blacksmiths' helpers, 20.59 per cent; and by carpenters, 32.79 per cent. The total extra sum earned in premiums during the fiscal year 1915 was thus $34,125.39, which was shared by about one-half of the 650 employes.

There was no difficulty in answering the other complaints and showing them to have as little foundation as the ones which have been specifically described. As to the number of accidents, the records show that there were not as many among the premium workers as among the day workers. There had been no evidence of failure of healh upon the part of the men, and no complaint of it. A number of men questioned on the subject denied it, and no man could be found who claimed, or would admit, that his health had been injuriously affected, and no man claimed that he had been overworked. As to the rejections for spoiled work, the records show that these also have been no greater among the premium workers than among the day workers.

The question remains to be answered as to why there should have been presented numerously signed petitions for the abolition of the system. If the reason given for the petitions were real ones they ought to have disappeared upon showing that there was no foundation for them. I think that in many instances the petitions do not represent the real sentiments of those whose names were attached to them. Upon inquiry some of the workmen stated that they liked the system, and had refused to sign the petitions. Several stated that they did not wish to sign, but had done so under compulsion. It was discovered that the facts alleged in the petitions were not advanced by the actual signers, at least by a considerable number of them. Many signatures were obtained without showing the subject-matter of the petitions which were signed, under which subject-matter these signatures were afterwards copied, to appear in the same handwriting, the signers knowing only that they were signing a petition against the Taylor system. Still, it

must be stated that some of the workmen, including men who were earning good premiums, declared voluntarily their opposition to the system.

I think that the petitions have been due to the influence of the labor organizations. I can see some reasons why labor leaders should not like the system; one of these being that since it offers more to labor than the unions do, its success would threaten the membership of the unions. Another reason for opposition upon the part of organized labor is that the system increases the productivity of the individual, which organized labor has fought in all the forms in which it has made its appearance. Labor-saving machinery is not now openly opposed by labor unions, but all large employers know the hostility which is felt towards its introduction. Scientific management, being a labor-saving method, comes under the ban.

Matters were in this state when the bill making the regular appropriations for the support of the army was under discussion upon the floor of the house. The following legislation was proposed as an amendment to the bill:

"PROVIDED, That no part of the appropriation made in this bill shall be available for the salary or pay of any officer, manager, superintendent, foreman or other person having charge of the work of any employe of the United States government while making or causing to be made, with a stop-watch or other time-measuring device, a time study of any job or any such employe between the starting and completion thereof or of the movements of any such employe while engaged upon such work; nor shall any part of the appropriations made in this bill be available to pay any premium or bonus or cash reward to any employe in addition to his regular wages, except for suggestions resulting in improvements or economy in the operations of any government plant; and no claim for service performed by any person while violating this proviso shall be allowed."

In the senate there was considerable debate, and some very interesting speeches. The debate is recorded in the Congressional Record of Feb. 23, 1915, and there may be found published, appended to the remarks of Senator Weeks, a good deal of literature which has appeared from time to time in connection with the establishment of scientific management at the arsenals. The senate rejected the prohibitive legislation, but it was restored in conference between the two houses, and is now part of the law. It is not, however, as effective as it was designed to be by its proponents. For one thing, it applies only to the fiscal year ending June, 30, 1916; and for another, it is not applicable to expenditures from any other appropriations than those made in the bill for the support of the army. The officers who conduct the arsenals are paid from such appropriations; their conduct or direction of time-studies is therefore prohibited, and time-studies have ceased. These had been made at the Watertown arsenal only; but premium payments had been made both at both the Watertown and the Frankford arsenal. The work at the Frankford arsenal being repetitive in its character, lends itself readily to piece-work, and has been transferred to this class, which is not prohibited by the legislation. The work at the Watertown arsenal is practically all done under appropriations made, not in the army bill, but in the fortification bill, and premium payments for it are therefore not forbidden, and have been continued. The contest for the complete suppression of time-study and the premium system of payment has, however, only been postponed. The prospect for its success may be judged by the fact that the majority in the house of representatives, at the last session, in favor of the legislation passed was six to one. We now have a new congress, with a large new membership, especially in the house of representatives, but unless a very considerable effort shall be made by somebody, the indication of the last session is that the work of suppression of these features of scientific management in government establishments will be made complete.

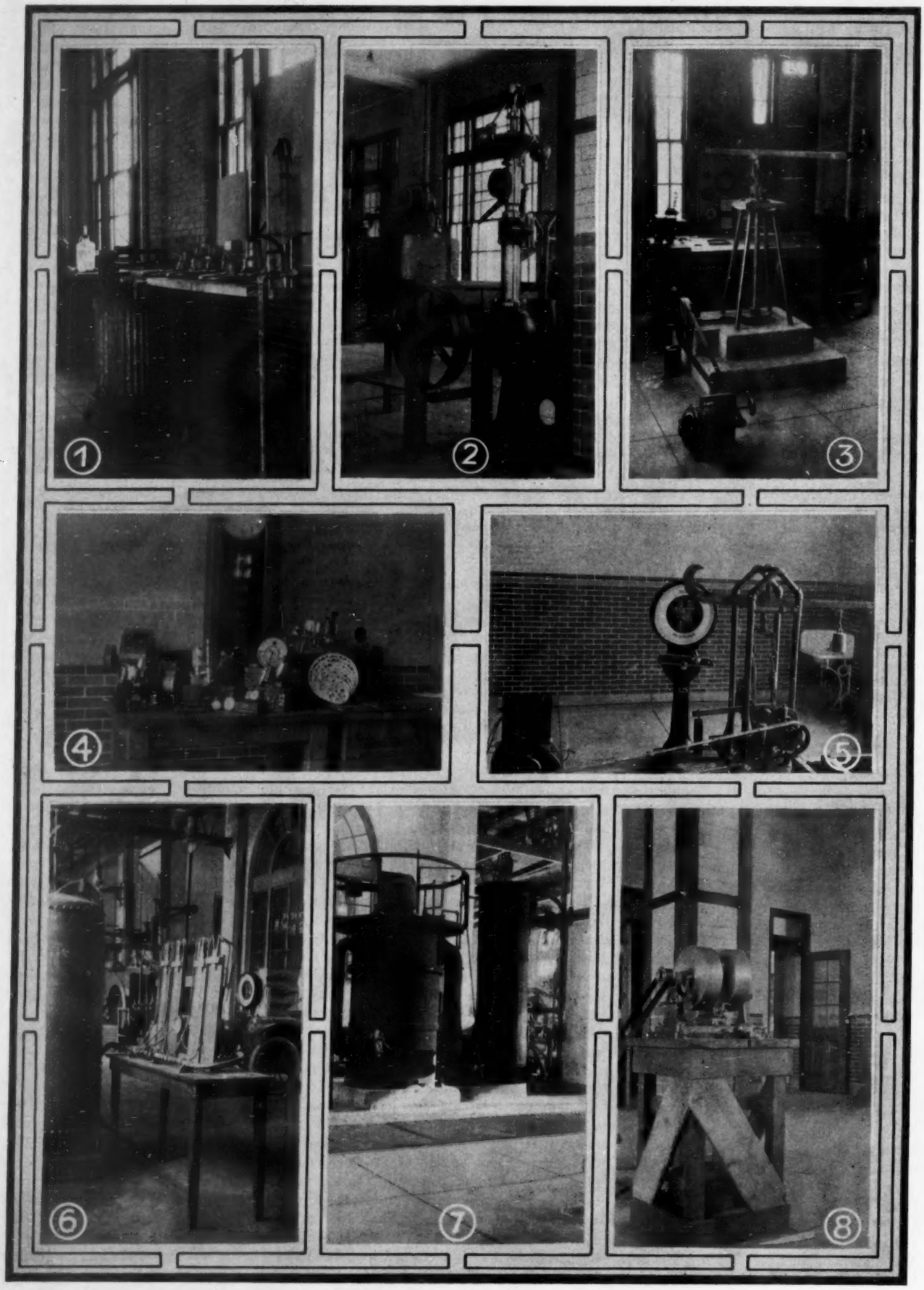
Facts Regarding Flame Temperatures

IN A paper entitled "The Combustion of Gas and Flame Temperature", read at a recent meeting of the Cleveland Engineering Society, Frederick Peiter states that flame temperatures are not as well understood by engineers as they should be, largely for the reason that the question has been treated in an abstract manner by scientists, rendering it rather difficult to correlate the technical data available with the concrete engineering problem. The engineer, however, has to show actual results, and with his limited knowledge of the subject was forced to the "cut and try" method, which sometimes succeeds in spite of its manifest difficulties.

"A flame temperature is dependent upon several variables, including the latent heat of the combustile gas, the specific heat of the products of combustion, the mass of the products of combustion, the specific heat of the substance to be heated, the mass of the substance to be heated, the rate of combustion, and the type of the furnace. With seven variables the problem might seem hopeless; but by considering at the start only the first three of these variables, it can be shown that the laws governing the last four may be approximated in a sufficiently accurate manner to permit of their use in practical problems."

The physics of flame temperatures are briefly considered in the paper and Damour's formula is discussed and applied. The author also presents curves showing the flame temperatures of several characteristic gases under different conditions, including lean coke oven gas burned with cold and with preheated air, and a natural gas burned with air. The details of burner construction also are covered and the author states that it is advantageous to build the heating flue with reference to the flame length. The flame, it is said, may be shortened by increasing the cross section of the flue, by placing baffles in the flue, by increasing the velocity of the gas with reference to the air, or by smashing the gas into the air. The design of two typical coke ovens provided with short and long flame burners respectively, is discussed. With reference to these ovens the author concludes with the following statement: "Both of these ovens do the same amount of work, that is, they coke the same amount of coal in the same time, but the short flame oven works hotter in its combustion chambers and the temperature of the refractories drops considerably when the oven is reversed. In other words the brickwork of the short flame oven is subjected to considerable variations in temperature. In the long flame oven the maximum heat is lower and while variations in the heat of the brickwork occur they are not as great as those that occur in the short flame oven."

The Stromberg Electric Co., Chicago, is distributing six illustrated bulletins devoted to its self-winding clocks, relay panels, time recorders for cost keeping, automatic time system apparatus, office time stamps and employes' time recorders. The different apparatus is described at length in the respective bulletins and their advantages and applications are pointed out.



FIGS. 1-8—TESTING APPARATUS AT CARNEGIE INSTITUTE OF TECHNOLOGY

Interesting Equipment for Testing

THE FACILITIES of the Carnegie Institute of Technology include many types of apparatus for testing materials, a large separate laboratory being provided for that purpose. Great difficulty is experienced in purchasing such equipment "ready made", and much of it is acquired through the exigencies of tests

BY PROF. W. TRINKS

THE mechanical laboratory of the Carnegie Institute of Technology, Pittsburgh, was equipped only 10 years ago. Originally the materials testing and the mechanical engineering laboratories formed one unit. After two years, the laboratories were separated and two halls were provided for the department of mechanical engineering. One room was equipped as a laboratory and the other divided into class rooms and a drawing room.

Equipping the laboratory proved difficult, as most of the machinery was located temporarily to permit future growth. Before the new power plant was completed an elaborate rope drive had been installed for transmitting power from a steam engine, Fig. 11, to a line shaft. The rearrangement of the laboratory has necessitated the demolishing of the line shaft, so that the rope gear is left with nothing to drive except a brake wheel.

The present arrangement of apparatus and machinery permits great freedom in shifting apparatus about the laboratory to accommodate further development. Two rooms are located on bed rock and are reserved for heavy machinery. Another room, resting on strong columns over a basement, is assigned to medium heavy machinery, while a fourth room is adapted to the use of light machinery.

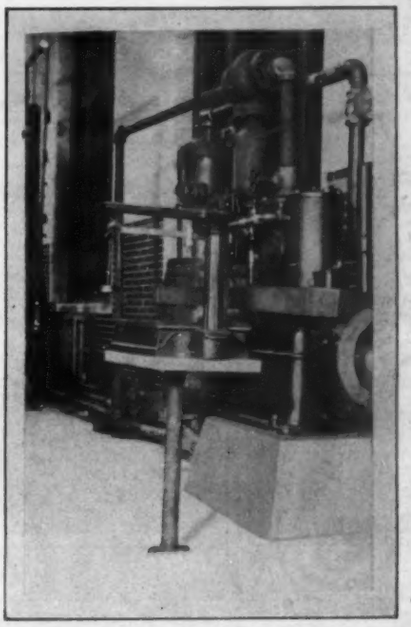


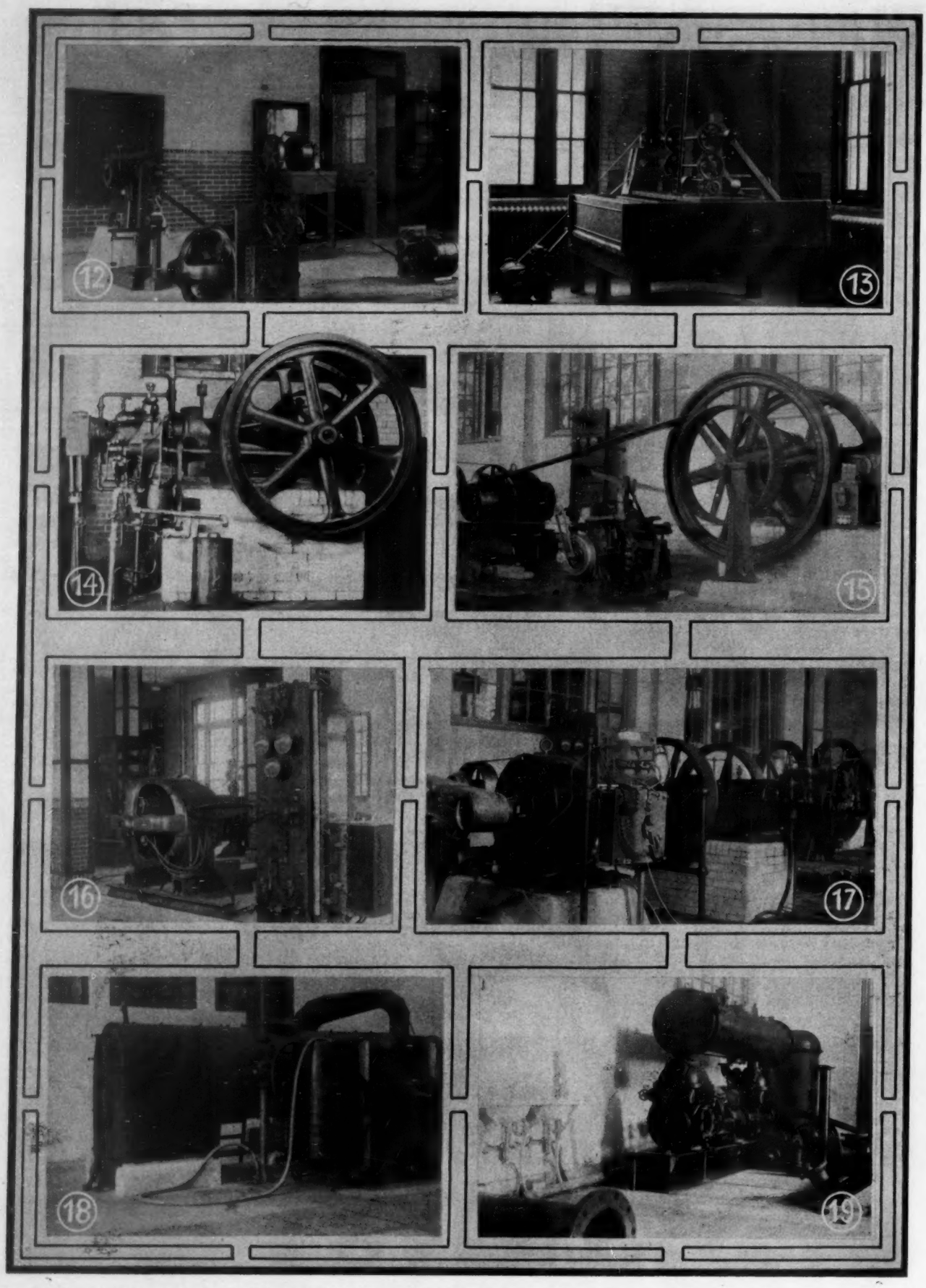
FIG. 9—DETERMINING STEAM CONSUMPTION OF AN ENGINE

One of these rooms has a portion devoted to internal combustion machinery. This includes a bessemer two-cycle gas engine, Fig. 15, a De Lavergne four-cycle oil engine, Fig. 14, and a Northway automobile engine, equipped with a Schultze optical indicator.

The center of this room is reserved for air machinery. Fig. 17 shows an electrically-driven Bury air compressor, and Fig. 6 shows a portion of two Ingersoll-Rand positive displacement air tanks for measuring the flow of compressed air. From these tanks the air passes through a series of measuring instruments. A twin Ingersoll-Rand air compressor with inter cooler and after cooler also is provided. Outside of this room is a cistern 32 feet in diameter and 16 feet deep, which for years served as a cooling pond for the gas engines and for the condensing water of the laboratory. A new pond was built recently, and it is planned to put a large drop holder into the old cistern for measuring large volumes of air.

FIG. 10—DEMONSTRATION VESSEL USED AS CONDENSER

FIG. 11—ROPE DRIVE FROM STEAM ENGINE—PART OF OLD INSTALLATION



FIGS. 12-19—TESTING APPARATUS AT CARNEGIE INSTITUTE OF TECHNOLOGY

Another room is devoted principally to steam-driven machinery and to a gas producer, Fig. 7. The latter is located near a locomotive type boiler, Fig. 18, thus keeping all coal-fired equipment together. The gas producer and scrubber are of the updraft type, and are designed for gasifying coke or anthracite coal. In this room is also located a surface condenser, Fig. 19, shown in process of re-erection. Vacant space in these rooms will be occupied partly by steam turbine and turbo blower machinery, which is to take the place of a single-wheel Curtiss turbine now in the laboratory.

Test Belt Transmission

In one of the two upper rooms is a belt transmission tester, Fig. 16. The input of power is measured by an electric motor and the belt tension is measured by a hydraulic support. The power output is measured by an ordinary water-cooled brake. The design of this machine required several years, as many difficulties had to be overcome.

Among the simpler machines in these rooms is a vertical whirling shaft which in Fig. 3 is shown rigged up for calibrating anemometers. The dry friction apparatus, Fig. 12, is used for determining dry friction, such as in brake shoes, and for measuring the efficiency and capacity of friction wheels in power transmission. For studying the friction of oiled bearings, two machines are used, one based upon the running down principle, Fig. 8, and a ring-oiled bearing, Fig. 5. The running down machine is ideal in principle, the quantity of the oil for a given condition being directly proportional to the total number of revolutions which the wheel makes after being relieved from the drive at a given speed.

Friction losses in gearing are measured by the Weber floating dynamometer, Fig. 13. Of considerable interest to students are governors, one of which is shown in Fig. 2. Students compute the speed at which the governor should be in equilibrium, then test the equilibrium speed, and finally reason out why the two speeds do not coincide.

In Fig. 9 is shown apparatus for roughly determining the steam consumption of an engine by a heat balance. The exhaust from the engine runs into a barrel where it mixes with running cold water; the hot water is discharged through nozzles in the bottom of the barrel. The number of open nozzles and the height of water in the barrel measure the rate of flow of hot water. From this and from the temperature rise, the steam consumption of the engine is determined. Fig. 10 shows a demonstration vessel which is being used as a condenser.

In all laboratory work, some students are found who do very little work in the laboratory, but who use the observations of others to write up excellent reports. When discovered, they must perform a series of "one-man" experiments in which copying is out of the question. Apparatus for a number of these "one-man" experiments are provided in the laboratory, one of which is shown in Fig. 1. A number of water meters are arranged in series, the circuit discharging into a tank on scales. Constant rate of flow is adjusted by an orifice meter shown in the foreground.

Little Ready Made Apparatus

While this department teaches mechanical engineering in its relation to steel works, the laboratory equipment for this purpose is limited. Little equipment of this kind can be purchased ready made and no other school has an installation which could serve as a foundation to build on. Equipment for finding the work requirements of engine-driven rolling mills is shown in Fig. 4. An experimental converter is now being installed and an experimental rolling mill is being designed for the work.

Manufactures Novel Steel Truss Section

AN expanded steel truss section said to possess unusual strength has recently been put on the market by the Bates Expanded Steel Truss Co., Chicago. The results of tests of the truss, compared with the steel section from which it is derived, made at the laboratory of the Illinois Steel Co., are shown in Fig. 3. These tests indicate that while the original steel section bore only 400 pounds pressure without deflection and failed at 600 pounds, the same section after expanding bore a load of 1,600 pounds without deflection and did not fail until a load of 3,250 pounds had been applied. The truss is produced by slitting the web of a specially rolled steel H-sec-

FIG. 1—EXPANDING MACHINE DRAWING WEB INTO TRUSS FORMATION

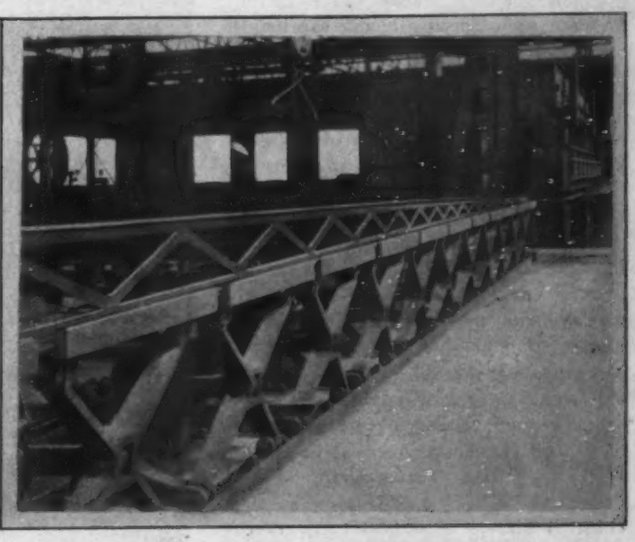


FIG. 2—COMPLETED TRUSS BEING RECEIVED ON COOLING BED

EXPANDED POST H1			POST SECTION H2		
LOAD P IN LBS.	DEFLECTION IN .001 IN.	SET IN .001 IN.	LOAD P IN LBS.	DEFLECTION IN .001 IN.	SET IN .001 IN.
100	9		100	200	
200	12		200	250	
300	23		300	300	
400	30		400	350	
500	45		500	500	5
600	55		600	680	200
700	46				
800	61				
900	63				
1000	66				
1100	91				
1200	82				
1300	92				
1400	104				
1500	—				
1600	120	NO			
1700	121	2			
1800	122	1			
1900	136	2			
2000	146	4			
2100	145	4			
2200	150	4			
2300	179	11			
2400	173	11			
2500	190	15			
2750	214	26			
3000	238	37			
3250	454	239			
FAILED BY BUCKLING IN TOP FLANGE AT 3250 LBS. LOAD			FAILED AT 600 LBS. LOAD		

FIG. 3—COMPARATIVE TESTS OF PLAIN AND EXPANDED POST SECTIONS

tion in two parallel cuts for its entire length, portions of the section being left intact at staggered intervals. The section is then heated in a continuous oil-fired furnace, passing thence to expanding machine. With a force of 500,000 pounds, the slotted section of the web is expanded into a zig-zag truss formation, producing a series of triangular spaces. The H-sections may be expanded into tapering trusses for posts, or constructed with the border members parallel. The principle on which the gain in strength rests is that a triangle is the only geometric figure whose shape cannot be changed without altering the length of one of its sides.

Massive Rotary Shear

The rotary shear shown in Fig. 4 weighs 100,000 pounds and contains two cutting discs 12 feet in diameter, each weighing 16,000 pounds. The lower disc extends 10 feet below the floor in a concrete pit. The knives of the shear do not cut entirely through the web of the girder, as it is said that if the cut is made halfway through the fibers of the metal will readily separate when the expanding tension is applied. The sheared section is heated in a continuous, oil-fired, reheating furnace of special design. The hydraulic expanding machine is shown in Fig. 1. An excess of metal is provided at the edge of the sheared portion in order to prevent the metal from tearing under the strain. The expanding machine is operated by two plungers, one at each end, which exert an equal tension, producing a parallel truss formation. To produce a tapered truss, one plunger is disconnected, the upper member of the truss being pivoted. Thus one end of the truss is drawn out considerably wider than the other. The expanded truss finally goes to a cooling bed, Fig. 2, and when it reaches a temperature of about 200 degrees Fahr. it is dipped in a paint solution, after which it is ready for shipment.

FIG. 4—ROTARY SHEAR USED IN CUTTING SECTION TO BE EXPANDED

Spectroscopic Steel Analysis

The subject of the quantitative spectroscopic analysis of steel was recently investigated at the request of various manufacturers of steel. At present, in the judgment of the majority of eminent spectroscopists, the quantitative spectroscopic analysis of steel can be made only by an experienced observer at the expense of great labor and the exercise of much patience. An attempt has been made to bring the subject within the scope of the average analytical chemist and to increase the accuracy of the results. The results to date are quite encouraging. The preliminary work is rather large, but once it has been done the labor of analysis is not great. Consider a single simple example, the estimation of the chromium content of a low-carbon steel. Leaving the other constituents of the steel essentially in the same proportions, samples are made up, or selected from stock, having a chromium content of 0.02 to 4 per cent, each sample having about 25 per cent more chromium than the one before. The spectrum of each of these samples is photographed, and the comparison of a photograph of the spectrum of the unknown with this series permits an estimation of the chromium content to be made with some accuracy.

Will Make Ferro

From Brazilian Ore at Sheridan Furnace, Which Changes Hands.

New York, March 21.—Another addition to the list of domestic blast furnaces producing ferro-manganese and other manganese alloys for the market will be made as the result of the purchase of the Sheridan, Pa., furnace of the Berkshire Iron Works by E. J. Lavino & Co., Philadelphia, from the firm of Naylor & Co. and other interests which had owned the plant. The furnace is not in blast at the present time, having been idle for several years. When last it was operated, it ran on foundry iron. The furnace originally was built in 1874 and 1875 and rebuilt in 1891. It has had a rated annual capacity of about 43,000 tons of iron. The new owners will put the plant in shape for early operations in the making of ferro-manganese from Brazilian ore of which they control a large supply. This firm recently has made conversion arrangements with various furnace interests for making ferro- manganese from ore to be furnished by itself. Among these have been the American Manganese Mfg. Co., Dunbar, Pa., and the Lackawanna Iron & Steel Co., Lebanon, Pa., the latter covering the North Cornwall furnace.

Will Equip Foundries

Wonham, Sanger & Bates, Inc., engineers and contractors, 17 Battery place, New York, have booked contracts for furnishing a number of complete installations of foundry equipment, the largest of these contracts involving equipment for the large new foundries of the New London Ship & Engine Co., Groton, Conn.; the Staten Island Shipbuilding Co., Port Richmond, N. Y., and the Crouse-Hinds Co., Syracuse, N. Y. The New London foundry is to be one of the most modern in the country, and the contract involves electric traveling cranes, electric elevator, air furnace, cupola, large sand blast chamber and all other necessary equipment. The contract from the Staten Island company includes electric traveling cranes, cupolas, blowers, core ovens, elevator, etc.; while the equipment at the Crouse-Hinds plant will be of the same character. These contracts cover not only the necessary equipment, but engineering services with the object of arranging and operating the plant to insure most economical results.

Justice Tanner in the Superior court at Providence, R. I., has appointed Elijah Astle permanent receiver of the Uniform Seamless Wire Co., of that city, with bond placed at $25,000. The company was incorporated in 1908 with a capital stock of $200,000. It was represented at the hearing that the corporation is insolvent and unable to pay its current debts.

Adopts New Name

The Quigley Furnace & Foundry Co., with works at Springfield, Mass., and sales office at 105 West Fortieth street, New York, has had its name changed to the Metals Production Equipment Co. The company has recently added to its business a brass rolling mill department for the production of flat brass and for this reason the adoption of a new and more comprehensive name was considered advisable. No change has been made in the general management or policy.

Credits Arranged

Toronto, March 21.—War orders, which have been few in number for some time, will now be given out by the imperial munitions board for large amounts as an arrangement has been effected under which the Canadian banks have agreed to establish in Canada a credit of $75,000,000 for the imperial treasury. This amount can be drawn upon by the munitions board as required in payment of orders to be placed in Canada during the next two months. New orders are now ready to give out and it is expected that the total to be issued during the next three months will run over $100,000,000, as further arrangements can be made for additional credits later on. The board, during the last two weeks, has received from Britain orders amounting to $20,000,000.

Will Make Brushes

The Milwaukee Brush Mfg. Co., Milwaukee, Wis., has been incorporated with a capital of $50,000 to engage in the manufacture of a complete line of brushes and brooms adapted for use in foundries, machine shops and industrial plants generally. Wire, bristle and fibre brushes will be made. The plant operated by the company is well equipped throughout and those engaged in the active management all have had a wide experience in the brush manufacturing industry. E. F. Streich is president; F. D. Jacobs, vice president and sales manager, and E. W. Hoffman, secretary and treasurer.

Plans for A.S.M.E.

Meeting to Be Held in New Orleans in April

Plans have been practically completed for the spring meeting of the American Society of Mechanical Engineers, which will be held in New Orleans April 11, 1914. Headquarters will be established at the Hotel Grunewald and the meeting will open with an informal reception on Tuesday, April 11. Professional sessions will be held on Wednesday, Thursday and Friday mornings, April 12, 13 and 14. There will be excursions to local points of interest on Wednesday and Friday afternoons and an entertainment at the New Orleans country club on Thursday afternoon. On Wednesday evening, April 12, an address will be given by W. B. Thompson, commissioner of public utilities of the city of New Orleans. The opening session will be featured with a paper on "Industrial Preparedness", by Spencer Miller, Lidgerwood Mfg. Co., New York. Mr. Miller is a member of the United States naval consulting board. Papers also will be presented on the measurement of the flow of fluids, dynamic balance of machine parts, transmission of heat, fuels, etc.

Arrangements have been made to run an official train for the convenience of the members of the society from New York to New Orleans, leaving New York at 3:34 p. m., April 8. This train will stop all day Monday, April 10, at Birmingham to give the members an opportunity to inspect the iron and steel development of the Birmingham district. The Birmingham section of the American Society of Mechanical Engineers has arranged for a special reception.

The Foster Bolt & Nut Mfg. Co., Cleveland, has closed a contract with the George B. McMillan Co., Cleveland, for the erection of a new building 27 x 126 feet, which will give the company an additional floor space for the increase which it has made in its manufacturing department. This concern has erected a new building each year since it has been in business with the exception of the past year.

More Open Hearths.—The Carnegie Steel Co. will build three additional open hearth steel furnaces and a soaking pit at its plant at Farrell, Pa., to cost approximately $1,000,000.

Thomas F. Jennings has been appointed superintendent of the foundry operated by the Utah Copper Co., Garfield, Utah.

Steel Corporation's Great Earnings

Reflect Wonderful Change in Business Conditions—Production Large, But Does Not Make New Record—Wages Advanced—Accidents Decrease

THE very remarkable change in business conditions in 1915—and particularly in the last half of 1915—as compared with 1914, is reflected in the fourteenth annual report of the United States Steel Corporation, which shows that the earnings, before charging interest on bonds and mortgages of subsidiary companies, amounted to $140,250,066 for 1915, compared with $81,746,517 in 1914. The surplus net income for 1915 was $44,260,374, which compares with a deficit of $16,971,983 in 1914. It should be noted, however, that in 1915 only 1¼ per cent was paid on the common stock, while in 1914, 3 per cent was paid.

A great change is also shown in the production of various products. For example, the production of steel ingots was 16,376,492 tons in 1915, compared with 11,826,476 tons in 1914. The output of blast furnaces increased from 10,052,547 tons in 1914 to 13,641,508 tons in 1915. A decrease was shown in the production of universal portland cement, the number of barrels being 9,116,000 in 1914 and only 7,648,658 in 1915.

Judge Gary's Comment

Judge Gary, in commenting on general conditions, says:

"The improvement in the demand for iron and steel products which became evident before the middle of 1915 continued in increasing volume throughout the remainder of the year, both for the domestic and the export trade. Until the latter part of the year, however, the advances in the prices received for domestic business were moderate and the average selling prices received for the year were only slightly in excess of those for the preceding year. In the closing months of the year the demand for products for the domestic trade for future delivery exceeded the producing capacity of the country and caused price advances. The demand for products for export was the largest for any year in the history of the Corporation. At December 31, 1915, the unfilled orders of the subsidiary companies for both the domestic and export trade totaled 7,806,220 tons of rolled products.

"The total production for the year 1915 of all classes of rolled and other finished steel products for sale was equal to about 85 per cent of the annual capacity of the mills. During the last quarter of the year the output equaled the maximum steel producing capacity. The year's production of cement was about 64 per cent of the capacity."

The expenditures by all companies in 1915 for maintenance and renewals, including the relining of furnaces, and for extraordinary replacements, were $43,366,643, compared with $45,372,594 in 1914 and $59,942,970 in 1913. The principal expenditures in 1915 were: Manufacturing properties, except blast furnace relining and renewals $26,768,115, blast furnace relining and renewals, $1,296,295; iron ore properties, $770,942; railroads, $10,169,837; steamships and docks, $719,087.

Inventories

The report for 1914 showed decreases in inventories in all classes of materials, supplies and products on hand, with the exception of iron ores, pig iron, scrap, ferro and spiegel, rolls, molds and a few minor items. The report for 1915 shows a decided decrease in the inventory valuation of iron ore. The following is a general classification of the inventory valuation Dec. 31, 1915, in comparison with the valuations at the close of the preceeding year:

	Dec. 31, 1915.	Dec. 31, 1914.
Iron Ores	$ 45,532,472	$ 57,874,986
Pig Iron, Scrap, Ferro and Spiegel	9,075,586	9,344,968
Coal, Coke and Other Fuel	4,925,090	3,460,218
Pig Tin, Spelter, Copper, Nickel, Aluminum and Dross and Skimmings	7,866,748	4,396,008
Limestone, Fluxes and Refractories	3,011,134	2,545,741
Rolls, Molds, Stools, Annealing Boxes, etc.	6,638,562	6,244,415
Manufacturing Supplies, Stores and Sundry Items not otherwise classified	17,343,454	14,897,414
Ingots—Steel	1,790,298	1,044,080
Blooms, Billets, Slabs, Sheet and Tin Plate Bars, etc.	11,658,042	8,426,734
Wire Rods	953,535	589,587
Skelp	1,824,779	1,171,962
Finished Products	31,091,145	31,660,054
Mining Supplies and Stores (for ore and coal properties)	2,851,564	2,522,018
Railroad Supplies and Stores	3,767,177	3,809,151
Merchandise of Supply Companies	674,527	675,159
Material, labor and expense locked up in bridge and structural contracts $ 26,510,792		
Less, Bills rendered on acc't 24,514,354	1,996,438	1,424,854
Stocks abroad and on consignment	6,857,423	7,380,012
Material in transit	3,255,926	623,675
Total	$161,113,900	$158,091,036

The expenditures in 1915 by all companies chargeable to capital account for the acquisition of additional property and for additions and extensons to the plants and properties, less credits for property sold and the net credit for ore mine stripping and development operations, amounted to $15,337,431, compared with $22,746,031 in 1914. Expenditures included the following: Minnesota Steel plant, Duluth, $2,541,698, compared with $4,094,363 in 1914 and $5,912,027 in 1913; other properties, exclusive of the Tennessee Coal, Iron & Railroad Co., $13,559,453, compared with $18,156,402 in 1914 and $33,065,894 in 1913; Tennessee Coal, Iron & Railroad properties, $1,461,224, compared with $495,264 in 1914 and $1,274,440 in 1913.

The total expended since April 1, 1901, for additional property and construction and for net unabsorbed outlays for stripping and development work at mines amounted to $493,813,701.

The average number of employes in the service of all companies during the year 1915 was 191,126, compared with 179,353 in 1914 and 228,906 in 1913. A comparison of the years 1914 and 1915 is as follows:

Employes of	1915 Number	1914 Number
Manufacturing Properties	140,875	131,616
Coal and Coke Properties	19,485	16,155
Iron Ore Properties	9,668	11,170
Transportation Properties	18,240	17,857
Miscellaneous Properties	2,858	2,555
Total	191,126	179,353
Total salaries and wages paid	$176,800,864	$162,379,907
Average Salary or Wage per Employe per Day:		
All employes, exclusive of General Administrative and Selling force	$2.92	$2.88
Total employes, including General Administrative and Selling force	$3.01	$2.97

The volume of business done by all companies as represented by combined gross sales and earnings was $726,683,589, as compared with $558,414,933 in the preceding year. The gross sales by manufacturing, iron ore and coal and coke companies to customers outside of the organization amounted to $486,352,054, compared with $380,228,143 in 1914 and $518,999,605 in 1913.

Comparing 1915 with 1914, domestic shipments show an increase of 13.1 per cent, not including cement, which decreased 10.3 per cent. Export shipments show an increase of 112.4 per cent. The shipments of various products are shown in the table on page 659.

Comparison of Prices

The prices received in 1915, based on the total tonnage of rolled and other finished steel products shipped, showed, in respect of domestic shipments, an in-

crease of 26 cents per ton over the average price per ton received in 1914, but in respect of export shipments the increase was $4.19 per ton, and for both domestic and export the average increase was $1.05 per ton.

Mills Were Ready

The increased activity in business which developed in 1915 found the mills and properties in satisfactory condition to handle the large demand promptly and efficiently. Due to this condition a relatively lesser amount of expenditures was required for ordinary and current maintenance during the year, although operations were about 33 per cent greater than in 1914. The appropriations for additions and improvements authorized for 1916 include outlays for general rebuilding and replacement work, and expenditures in 1916 for these purposes will undoubtedly be materially in excess of the outlays in 1915. These expenditures are paid from funds set aside through allowances made from gross earnings for deterioration and obsolescence.

The sum total of all charges to and allowances from gross earnings for year 1915, to cover exhaustion of minerals, deterioration arising from wear and tear of improvements and for obsolescence, amounted to $72,957,988, in comparison with a total in 1914 of $64,847,641, an increase of $8,110,347.

Domestic Shipments	1915 Tons	1914 Tons	Increase or Decrease Tons	Per Cent
Rolled Steel and Other Finished Products	9,331,363	7,982,325	1,349,038	16.9 Inc.
Pig Iron, Ingots, Spiegel, Ferro and Scrap	543,193	494,144	49,049	9.9 Inc.
Iron Ore, Coal and Coke	1,004,323	1,153,575	149,252	12.9 Dec.
Sundry Materials and By-Products	103,869	80,357	23,512	29.3 Inc.
Total tons all kinds of materials, except Cement	10,982,748	9,710,401	1,272,347	13.1 Inc.
Universal Portland Cement (Bbls.)	8,176,583	9,117,752	941,169	10.3 Dec.
Export Shipments	1915 Tons	1914 Tons	Increase or Decrease Tons	Per Cent
Rolled Steel and Other Finished Products	2,350,524	1,096,234	1,254,290	114.4 Inc.
Pig Iron, Ingots and Scrap	78,244	47,790	30,454	63.7 Inc.
Sundry Materials and By-Products	971	190	781	411.1 Inc.
Total tons all kinds of materials	2,429,739	1,144,214	1,285,525	112.4 Inc.
Aggregate tonnage of Rolled Steel and Other Finished Products shipped to both Domestic and Export Trade	11,681,887	9,078,559	2,603,328	28.7 Inc.

A program of new construction and improvement involving the expenditure of a large aggregate sum of money has been authorized. These extensions and improvements are largely for the purpose of economizing in cost of operation through installation of the latest and most modern type of facilities, including the conservation of by-products, and for diversifying lines of finished products.

Among the more important appropriations authorized under the program are the following:

New by-product coke plants at Clairton, Pa., 200 ovens; at Youngstown, O., 210 ovens; at Central furnaces, Cleveland, 180 ovens; and at Lorain, O., 225 ovens.

In the Pittsburgh District at Edgar Thomson works there will be installed a new central pumping station and water distributing system; at Schoen Steel Wheel works, Pittsburgh, an additional unit to the steel wheel plant, increasing the capacity by 150,000 wheels per annum; at Clairton Works, two additional open hearth furnaces and a 1,200-ton metal mixer; and at Donora works, a new duplexing steel plant comprising two 25-ton converters and a 1,300-ton mixer.

In the Youngstown district, at Ohio works, Youngstown, there will be constructed three additional open hearth furnaces; and at McDonald (near Youngstown) a new merchant bar plant, to comprise three bar mills, six hoop mills and one band mill, with auxiliary departments. At Ellwood City, Pa., the Shelby Steel Tube Co. will construct a large extension to its Standard works seamless tube plant.

In the Cleveland district, at the Cuyahoga Works of American Steel & Wire Co., a new rod and flat wire mill will be constructed, also additional wire drawing and galvanizing equipment; at Newburgh Works, one additional open hearth furnace. At Lorain works of The National Tube Co., four additional open hearth furnaces and a 40-inch blooming mill will be installed.

In the Chicago district, there will be constructed at Gary works of Indiana Steel Co., four additional blast furnaces, a duplexing steel plant comprising two 25-ton converters and two 100-ton tilting open hearth furnaces, a 40-inch blooming mill, a 160-inch sheared plate mill, two 10-inch and one 20-inch merchant bar mills, a forged steel wheel plant, four 3,000-kilowatt electric gas

	1915	1914	+Increase —Decrease
EARNINGS—Before charging interest on Bonds and Mortgages of Subsidiary Companies.			
First Quarter	$15 082 369 36	$20 450 988 60	— $5 368 619 24
Second Quarter	30 536 467 71	22 956 414 32	+ 7 580 053 39
Third Quarter	41 050 432 47	24 792 603 80	+ 16 257 828 67
Fourth Quarter	53 580 796 79	13 546 511 14	+ 40 034 285 65
Total for year	$140 250 066 33	$81 746 517 86	+$58 503 548 47
Less, Interest on outstanding Bonds and Mortgages of the Subsidiary Companies	9 854 054 69	10 082 902 69	— 228 848 00
Balance of Earnings	$130 396 011 64	$71 663 615 17	+$58 732 396 47
Less, Charges and Allowances for Depreciation applied as follows, viz.:			
To Depreciation and Extraordinary Replacement Funds	24 408 576 60	17 044 183 32	+ 7 364 393 28
To Sinking Funds on Bonds of Subsidiary Companies	1 553 587 99	1 903 041 68	— 349 453 69
To Sinking Funds on U. S. Steel Corporation Bonds	6 465 884 26	6 195 982 41	+ 269 901 85
Net Income in the year	$97 967 962 79	$46 520 407 76	+$51 447 555 03
Deduct:			
Interest on U. S. Steel Corporation Bonds outstanding	21 928 633 74	22 239 086 53	— 310 452 79
Premium paid on Bonds redeemed by Sinking Funds, viz.:			
On Subsidiary Companies' Bonds	107 210 28	87 331 46	+ 19 878 82
On U. S. Steel Corporation Bonds	864 100 00	822 200 00	+ 41 900 00
Balance	$75 068 018 77	$23 371 789 77	+$51 696 229 00
Add: Net Balance of sundry charges and credits, including adjustments of various accounts	765 813 94	124 978 40	+ 640 835 54
Balance	$75 833 832 71	$23 496 768 17	+$52 337 064 54
Dividends on U. S. Steel Corporation Stocks, viz.:			
Preferred, 7%	25 219 677 00	25 219 677 00	
Common, 1915—1¼%, 1914—3%	6 353 781 25	15 249 075 00	— 8 895 293 75
Surplus Net Income for the year	$44 260 374 46	*$16 971 983 83*	+$61 232 358 29

CORPORATION ACCOUNT, UNITED STATES STEEL CORPORATION FOR FISCAL YEAR ENDED DEC. 31, 1915 AND 1914.

engine units, additional waste heat boilers at open hearth plants and two 7,500-kilowatt steam turbo-electric units; and at the works of American Sheet & Tin Plate Co. at Gary, a new tin plate plant comprising 24 hot mills, with an annual capacity of 2,250,000 base boxes. At the South works of Illinois Steel Co. there will be installed a duplexing steel plant comprising two 25-ton converters and two 100-ton tilting open hearth furnaces and six gas-driven blowing engines to replace 10 steam engines. At Joliet works, there will be constructed a benzol recovery department as an extension to the by-product coke plant.

Additions and improvements authorized by the subsidiary transportation companies include the rebuilding of ore dock No. 2 with steel superstructure, at Two Harbors, Minn., the remodeling of ore dock No. 6 and a new car repair shop at same place; at Proctor, Minn., the construction of a 30-stall engine house, new coaling station, etc.; and by the Bessemer & Lake Erie Railroad Co. the replacing of the Allegheny river bridge with a new double track structure. There have also been ordered by the several subsidiary railroads 70 locomotives and 4,671 cars of various kinds. The Pittsburgh Steamship Co. has purchased six 6,500-ton capacity ore carrying steamers and has contracted for the construction of six 12,700-ton steamers.

The estimated total cost of the additions and improvements specifically mentioned above is about $70,000,000. The total amount unexpended on all authorized appropriations for extensions, additions and improvements at March 1, 1916, was $91,200,000. It is estimated that not more than $75,000,000 of this total will be expended in the year 1916.

In addition to expenditures to be made in 1916 on capital account, as above outlined, there will mature during 1916, or will have to be redeemed under sinking fund provisions, $10,470,000 of bonds of the subsidiary companies and approximately $6,825,000 of United States Steel Corporation bonds.

During the year 1915, a total of $11,420,894 of bonds, mortgages and purchase money obligations of the Corporation and the subsidiary companies was paid off. Of this total, $9,290,000 were redeemed through the sinking funds of the mortgages securing the bonds. There were also paid off during the year $5,647,804 mining royalty notes of subsidiary companies which had been issued and substituted for previously existing royalty obligations under mining contracts. No new issue of bonds, mortgages or purchase money obligations were sold to the public during the year.

Products	1915	1914
IRON ORE MINED		
In the Lake Superior Region	*Tons*	*Tons*
Missabe Range	17 209 664	10 894 463
Vermilion Range	1 273 825	1 112 854
Gogebic Range	1 277 419	1 469 601
Menominee Range	939 304	874 909
Marquette Range	618 108	496 896
In the Southern Region		
Tennessee Coal, Iron & R. R. Co.'s Mines	2 351 356	2 186 258
Total	23 669 676	17 034 981
LIMESTONE QUARRIED	5 795 925	4 676 479
COAL MINED		
For use in the manufacture of coke	20 800 204	15 890 382
For steam, gas and all other purposes	5 828 278	5 271 911
Total	26 628 482	21 162 293
COKE MANUFACTURED		
In Bee-Hive Ovens	9 701 692	7 092 792
In By-Product Ovens	4 799 126	4 081 122
Total	14 500 818	11 173 914
BLAST FURNACE PRODUCTION		
Pig Iron	13 517 598	9 909 062
Spiegel	7 175	25 397
Ferro-Manganese and Silicon	116 735	117 998
Total	13 641 508	10 052 457
STEEL INGOT PRODUCTION		
Bessemer Ingots	5 584 198	4 151 510
Open Hearth Ingots	10 792 294	7 674 966
Total	16 376 492	11 826 476
ROLLED AND OTHER FINISHED STEEL PRODUCTS FOR SALE		
Steel Rails (Heavy and Light Tee and Girder)	1 129 832	978 907
Blooms, Billets, Slabs, Sheet and Tinplate Bars	1 404 443	921 826
Plates	974 741	689 241
Heavy Structural Shapes	726 082	613 739
Merchant Steel, Bars, Hoops, Bands, Skelp, Etc.	2 118 366	1 423 740
Tubing and Pipe	919 280	818 435
Wire Rods	261 036	164 153
Wire and Products of Wire	1 771 945	1 380 376
Sheets (Black and Galvanized) and Tinplates	1 368 178	1 075 419
Finished Structural Work	476 896	521 225
Angle Splice Bars and All Other Rail Joints	190 758	129 849
Spikes, Bolts, Nuts and Rivets	74 289	62 133
Axles	95 476	64 662
Steel Car Wheels	77 569	53 638
Sundry Steel and Iron Products	173 748	117 169
Total	11 762 639	9 014 512
Spelter	32 031	28 031
Sulphate of Iron	35 377	30 212
	Bbls.	*Bbls.*
Universal Portland Cement	7 648 658	9 116 000

PRODUCTION OF RAW, SEMI-FINISHED AND FINISHED MATERIAL BY SUBSIDIARIES OF THE UNITED STATES STEEL CORPORATION IN 1914 AND 1915

Wage Advance

On Feb. 1, 1916, an advance was made in the wages and salaries of the employes of the subsidiary companies. This increase averaged approximately 10 per cent on the rates previously paid the employes affected. On basis of an annual pay roll equal in numbers to that for 1915, these advances in rates will call for an increased disbursement of approximately $14,000,000 per annum, while on basis of an employment equal to the average during 1913, the increased amount will be about $18,000,000 annually.

As of Jan. 1, 1916, there was offered to employes of the United States Steel Corporation and of the subsidiary companies, the privilege of subscribing for shares of common stock of the Corporation, at the price of $85 per share. Subscriptions were received from 24,940 employes for an aggregate of 49,742 shares. The conditions attached to the offer and subscription, aside from the feature of price, were generally similar to those under which stock has been heretofore offered to employes. The usual distribution of special compensation to employes under plan adopted in 1903 was also made.

During the year, the trustees of the United States Steel and Carnegie Pension Fund disbursed in pensions to retired employes, $659,389.42. In 1915, pensions were granted to 697 retiring employes. Dec. 31, 1915, there were 3,002 names on the pension rolls. The average age at which pensions to the foregoing were granted was 62.84 years, and the average term of service rendered by pensioners was 28.34 years.

During the past year, as in preceding years, careful thought and study have been given to conditions under which the employes work and live. The principal work during the year, however, was in extending efforts on lines which had already proven successful.

Although additional expenditures are being made wherever necessary through

installation of devices, facilities, etc., to safeguard employes from injuries, especial attention is now being directed toward enlisting the employes themselves in the prevention of accidents. At present 4,249 employes are serving on safety committees whose efforts are being expended in this direction.

The amount expended in 1915 by all companies for safety work was $608,644. Serious and fatal accidents in 1915, based on the number of accidents per 100 employes in service, were 5 per cent less than in 1914 and 43.5 per cent less than in 1906. Fatal accidents in 1915 were 15.38 per cent less than in 1914 and 59.27 per cent less than in 1906.

Voluntary Accident Relief Plan

This plan has been superseded to a large extent by workmen's compensation laws enacted by most of the states in which the subsidiary companies are operating. Such laws merely establish the principles upon which this plan of relief, regardless of legal liability, was inaugurated by the Corporation before any such laws were in force. The subsidiary companies have promptly accepted the compensation acts and assisted the state commissions in administering them. The total amount paid out by all companies in 1915, in connection with work accidents, was $1,998,751. Of this total, 84.76 per cent was paid directly to injured employes or their families or in taking care of them.

Sanitation

The standards established for sanitation in and about the mills, mines, etc., are being extended. Comfort stations were constructed during the year at many of the plants and mines and there were provided 175 showers and 3,103 lockers in addition to those previously installed. The total disbursements for sanitary work in 1915 were $953,056, of which total $215,512 were expended for protection of water supply and drinking water systems for use of the employes.

Welfare Work

Efforts have been continued looking towards improvement of the material welfare of employes and their families, through discussing with them sanitary methods of living, through establishing means of recreation and wholesome amusement, through encouraging them in the free use of unused land surrounding the plants for gardening, and through the organization of educational classes for employes in which courses of instruction on special and practical lines are given. The efforts in these directions have met with practical endorsement and co-operation on the part of the employes.

Grateful appreciation is expressed for the loyal and efficient services during the year of the officers and employes of the Corporation and the several subsidiary companies."

Operating Electric Furnaces

Editor *The Iron Trade Review*:

The writer cannot refrain from commenting on the editorial entitled "Grasping War's Opportunity" on page 412, of the Feb. 24th issue of your publication.

This letter is not written in the nature of a criticism because the point that we wish to make is perhaps largely to you a detail. The writer's pencil checked a point in your editorial in which you state that highly specialized skill is necessary to operate an electric furnace. This is not true of the Snyder electric furnace.

The last sentence in your editorial also caught the writer's attention. It is quite true that the early electric furnaces were designed in Europe, and the plans and specifications sold to the prospective purchaser, who was then in a position to build an electric furnace. The purchaser in each case acquired the knowledge necessary to build the furnace.

The practice of the Snyder Electric Furnace Co. has been quite different in that we do not furnish plans and specifications, but we build and install the furnaces. Therefore, we have been in a position to profit by engineering data accumulated, which has resulted in Snyder furnaces being unusually high in efficiency.

Snyder Electric Furnace Co.
By A. M. MINNICK.

Chicago, Feb. 29, 1916.

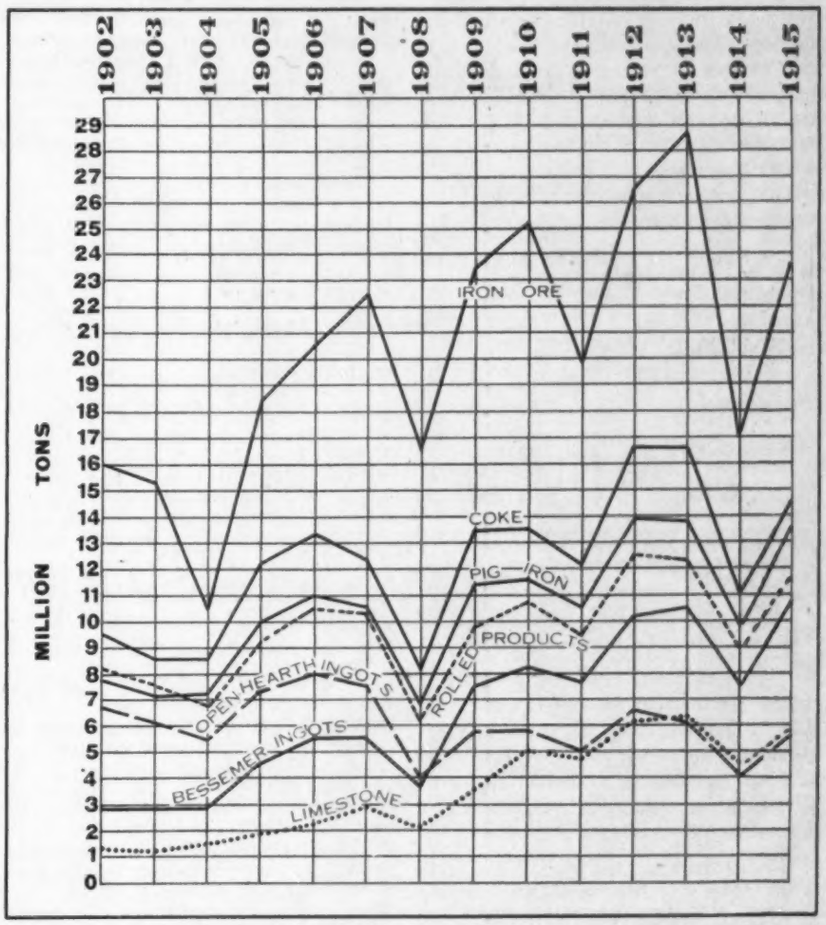


CHART SHOWING PRODUCTION OF LEADING PRODUCTS BY SUBSIDIARIES OF THE UNITED STATES STEEL CORPORATION, 1902-1915

"Credits and Collections," is the title of a book recently published by the La Salle Extension University, 2550 Michigan avenue, Chicago. The authors are Edward M. Skinner, formerly president of the Chicago Association of Commerce; R. S. White, collection manager of American Steel & Wire Co.; and H. E. Kramer, collection specialist. The book is devoted to a detailed analysis of the commercial problems of credit and collection.

The United Engineering & Foundry Co., Pittsburgh, will build a 36-inch blooming mill for the Ashland Iron & Mining Co., Ashland, Ky.

Iron and Money: Fact and Comment

President Donner's Interesting Comments on Business Conditions and Prospects in Submitting Annual Report of Cambria Steel Co.

PRESIDENT William H. Donner, in the Cambria Steel Co.'s annual report for the year ended Dec. 31, 1915, showing the largest profits in the history of the company, says that prospects for this year are most promising and he expresses the opinion that America's steel production for 1916 will undoubtedly establish a new record. "Ship building plants are all running to full capacity and this industry should be busy for a number of years," says Mr. Donner. "Stocks of steel on hand, not only in this country, but throughout the world need replenishing and it will take time for the production to catch up with the demand."

The expenditures during the year charged to improvements were $1,183,466; to equipment, $199,850; to extraordinary replacement and alteration, $529,037; to relining blast furnaces and rebuilding coke ovens, $33,152 (aside from $275,805 included in ordinary repairs of $3,158,000), a total of $1,945,505.

President Donner says:

"Profits for the last fiscal year were larger than ever before, notwithstanding the fact that the depression which became pronounced toward the close of 1913 and continued through 1914, was very much in evidence during the first half of this year. This condition prevailed so long that prices became unremunerative and in some instances sales were made at less than cost. A larger volume of business and better prices were secured in the last quarter on account of the increased demand brought about largely by the war, although domestic business also improved. Fifty-five per cent of the year's earnings was made during the last quarter.

"The war has eliminated the importation of steel more completely than was ever dreamed of under any proposed tariff and also gives us export orders that are unnatural, so that a phenomenal expansion in the industry is taking place, but it should not be forgotten that foreign competition will be a serious factor under the existing tariff whenever European manufacturers are ready for business and need the American markets.

"An important factor in your profits for the year has been the reduction in costs effected by many alterations and improvements throughout the works and the increased efficiency of your organization. Although wages have increased since 1912, Cambria's costs on finished products are fully $3.00 per ton below those of any year prior to that time. Results, however, have been slow in developing, as it requires time to diagnose troubles and economically make changes without seriously interrupting operations, and other improvements are needed. There are a number in contemplation which promise excellent returns.

"Your management recognizes the efficient work of your employes as an important factor in operating your plants. During the dull periods of 1913-1914 and 1915, no reduction was made in wage rates, the number of employes was maintained and regular employment was given. This was accomplished by improving your works and making replacements, alternations and improvements.

"The transfer of large holdings of stock of your company in the latter part of the year prompted the retirement from your board of directors of Messrs. Effingham B. Morris, Theodore N. Ely, Childs Frick and Samuel Bodine, the loss of whose valuable counsel and able assistance is a source of sincere regret. Messrs. Morris and Ely had served as directors and members of the executive committee since 1901, Mr. Morris having been chairman of the executive committee during this period."

COMPARATIVE STATEMENT OF INCOME ACCOUNT

	1911	1912	1913	1914	1915
Earnings	$3,618,334	$4,446,709	$7,787,970	$3,115,932	$8,326,672
Less Provision for Depreciation and Accruing Renewals and Exhaustion of Minerals	369,588	545,358	1,099,440	637,837	1,251,524
Net Earnings	$3,248,746	$3,901,351	$6,688,530	$2,478,095	$7,075,148
Fixed Charges	471,407	490,268	453,580	517,105	671,610
Net Income	$2,777,339	$3,411,083	$6,234,950	$1,960,990	$6,403,538
Dividends	2,250,000	2,250,000	2,700,000	2,250,000	2,700,000
Surplus Net income for Year	$527,339	$1,161,083	$3,534,950	$289,010	$3,703,538

COMPARATIVE TONNAGE OF PRODUCTION AND SHIPMENTS

	1911	1912	1913	1914	1915
Pig Iron	767,499	972,758	1,006,172	858,580	1,139,100
Ingots	973,457	1,382,650	1,495,546	1,188,240	1,452,276
Shipments (Finished Product)	636,382	1,038,634	1,062,737	783,922	1,021,462

La Belle Report

La Belle Iron Works, Steubenville, O., reports a surplus of $531,258 after bond interest and dividends, for the year ended Dec. 31, 1915. This compares with a deficit of $470,410 in 1914, a gain for the year of over $1,000,000. The company made liberal allowances for exhaustion of minerals and extinguishment of lease values, but paid out in dividends only $396,616, as against $743,655 in 1914 and $991,540 in 1913. Accumulated back dividends on preferred Dec. 31, 1915, amounted to 5 per cent. The sum of $250,000 was appropriated out of the surplus "for depreciation of capital assets". No such charge was made in 1914, while $25,000 was set aside in 1913. After all these charges the company was able to carry over $281,258 to the profit and loss surplus. The income account in detail follows:

	1915.	1914.
*Net earnings	$1,281,492	$588,811
Exhaust and exting...	253,758	209,899
Profits for year	$1,027,734	$378,912
Bond int.	99,860	105,668
Divs.	396,616	743,655
Total deduct.	$496,476	$849,323
Surplus for year	$531,258	†$470,410
Depreciation	250,000	.....
	$281,258	†$470,410
Prev. surplus	2,775,059	3,245,470
P. & L. surplus	$3,056,318	$2,775,060

*From operations, after deducting charges for maintenance $665,300 in 1915 and $636,200 in 1914.

†Deficit.

President R. C. Kirk, in his remarks to stockholders, said in part:

"The year 1915 was one of unusual problems. Opening with the unsatisfactory business conditions which existed in the previous year, recovery was slow until near the close of the last half, after which time progress was rapid and for the past several months demand has exceeded supply and values have reached figures unattained since the year 1907. Illustrative of the improvement in market conditions, it may be of interest to state that of total profits for the year as shown by the income account, certified by Price, Waterhouse & Co., to which certificate attention is invited, 84 per cent was earned in the last half of the year."

Stockholders of the company held a special meeting Oct. 27, 1915, and authorized the issue of $7,500,000 to be sold at the discretion of the board of directors. To provide funds for a by-product coke plant and to retire the outstanding first mortgage 6 per cent gold bonds, the directors sold for delivery Jan. 3, 1916, $3,500,000 5 per cent 25-year first and refunding mortgage sinking fund gold bonds.

A contract had been let in September for the erection of a by-product coke plant, consisting of 94 12¼-ton Koppers regenerative by-product ovens, having a daily capacity of 1,000 tons of coke, designed for the recovery of gas, tar, sulphate of ammonia and light oil. In November a contract was let for a benzol plant, to be operated in connection with the by-product coke plant. It is expected both plants will be operating in the third quarter of 1916. Several other minor plant additions also were made. The sum of $665,300 was expended for maintenance and repairs, being charged against the year's profits.

Bethlehem's Great Earnings

Advance extracts from the Bethlehem Steel Corporation's annual report for 1915, made public today, show the unprecedented gross earnings of $24,821,408, against $9,649,667 in 1914, an increase of 260 per cent. Net earnings amounted to $17,762,812 against $5,590,020. The net earnings were equivalent to over 112 per cent on the common stock after the 7 per cent preferred dividend. Orders on hand Dec. 31, 1915, aggregated $175,432,895, as against $46,513,189 the corresponding date the previous year.

Chairman Charles M. Schwab and President E. G. Grace, in a statement to stockholders and the general public declare that "an actual shortage of steel-making capacity exists in this country." They call attention to the government armor plate bill, now pending in congress with the statement that "if such a bill is passed the value of existing armor plants in this country will be virtually destroyed." It is pointed out that the Bethlehem Steel Corporation has more than $7,000,000 invested in its plant devoted to this use. Messrs. Schwab and Grace state they have offered to take one-third of the 120,000 tonnage to be required by the government over the next five years at $395 per ton for side armor, as against the price of $425 now prevailing, or will accept any fair price based upon the cost of manufacture to be determined by the attitude of accountants.

The report continues:

"In view of the earnings of the past year, dividends were declared of 7 per cent on the preferred stock and 30 per cent on the common stock of your corporation, payable in quarterly installments during 1916.

"With the recent extraordinary market for all classes of steel products and for ships, the various plants of your corporation enter the year 1916 with all departments, with one exception, running at full capacity.

"That exception is the armor plate department. Bethlehem Steel Co. has practically completed deliveries to the government on all pending armor contracts. Contracts for current year have not been awarded."

Sloss-Sheffield Report

The Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., in the fiscal year ended Nov. 30, 1916, earned 7.79 per cent on its $6,700,000 preferred stock, compared with 7.3 per cent the previous year. The income account compares as follows:

	1915.	1914.
Pig iron profits*	$432,259	$327,467
Coal profit	95,357	92,781
Coke profit	127,358	164,391
Rent, roy., etc.	232,038	243,674
Int., divs., etc.	9,409	15,292
Total inc.	$909,075	$843,605
Tax, license ⅞ gen. ex.	176,687	143,466
Interest	210,000	210,000
Surplus	$522,388	$490,139
Pref. divs.	351,750	469,000
Surplus	†$170,638	$21,139
Prev. surp.	3,357,553	3,336,414
Total surp.	$3,528,191	$3,357,553

*After charges for depreciation on coal and iron ore, and 35 cents per ton profit on coke manufactured.

†Equal to 0.53 per cent on $10,000,000 common stock, after allowing for 7 per cent on preferred, against 0.21 per cent on same stock previous year.

Will Make Drop Forgings

The Wyman-Gordon Co., Worcester, Mass., has been incorporated in Massachusetts with a capital stock of $3,000,000 to take over the business of the Wyman & Gordon Co., manufacturer of drop forgings, a $900,000 Massachusetts corporation having main plant at Worcester and a branch plant in Cleveland. The new stock issue will be divided into $1,000,000 6 per cent sinking fund cumulative first preferred stock, $500,000 second preferred stock and $1,500,000 common stock. The new interests in the organization are represented by Robert F. Herrick, Boston, widely known because of his connection with various important business undertakings, including the recently formed American International Corporation of which he is vice president, the Saco-Lowell Shops, manufacturer of textile machinery, the Reed-Prentice Co., Worcester, manufacturer of machine tools, and the Ludlow Mfg. Associates, Boston, maker of yarns, twines, etc.

The present management of the business, will continue in charge George F. Fuller remaining president.

Industrial Stocks

Industrial stocks, almost without exception, advanced last week and Wall street had another cheerful week. The starting of the punitive expedition to Mexico seemed to be pleasing to the stock exchange and the news from Europe in regard to the operations in France was not such as to cause any apprehension.

Transactions earlier in the week were very heavy and there was considerable excitement among speculators. Toward the end of the week, the market settled down somewhat. There has been an active demand for money, but the market has not shown much tendency to advance . The $75,000,000 credit to be set up by Dominion banks for Great Britain in connection with the placing of orders for munitions has attracted attention. The bonds are to be underwritten here, and they will probably be 5's, divided into 5, 10 and 15-year maturities.

Quotations at the close of business March 18 and changes in the leading stocks identified with the iron and steel industry for the week are shown in the following table:

	Close Mar. 18.	Net chg.
American Can	64	+3⅛
American Can, prfd.	112½	+2⅛
Amer. Car & Fdy.	72½	+3
Amer. Car & Fdy., prfd.	117	—1⅛
American Locomotive	79¾	+6¾
American Locomotive, prfd.	103¾	+1¼
American Steel Foundries	56⅜	+3⅛
Baldwin Locomotive	112	+5⅞
Baldwin Locomotive, prfd.	109½	+ ½
Bethlehem Steel	534	+53
Bethlehem Steel, prfd.	135	+3
Colorado Fuel & Iron	47½	— ⅞
Continental Can	84½	+1½
Continental Can, prfd.	110½	+2½
Crucible Steel	96½	+12
Crucible Steel, prfd.	117½	+3⅞
General Electric	169½	+2
International Harv. of N. J.	109¾	.....
Lackawanna Steel	81½	+4
Nat'l Enam. & Stamp. Co.	26⅞	+1½
Pressed Steel Car	55	.....
Pressed Steel Car. prfd.	103	+1
Pullman Palace Car	163	+ ⅜
Republic Iron & Steel	53¾	+1½
Republic Iron & Steel, prfd.	111½	+ ⅜
U. S. Cast Iron Pipe & Fdy.	25⅛	+3⅛
U. S. C. I. P. & Fdy., prf.	54	+4
United States Steel	86⅛	+2⅛
United States Steel, prfd.	117⅛	+ ⅞
Westinghouse Mfg.	68⅛	+2⅛

The following table shows changes in maximum quotations of stocks not listed on the New York stock exchange:

	High Mar. 17.	High Mar. 10.
American Radiator	395	398
American Ship Building	47⅞	41
Cambria Steel	81¾	81⅛
Chicago Pneumatic Tool	79	67¾
LaBelle Iron Works	51	52⅛
Lake Superior Corpn.	11⅜	11
Pennsylvania Steel	70	.....
Stewart-Warner Speed Co.	89⅛	87⅛
Warwick Iron & Steel	10¾	10¾
Westinghouse Air Brake	140	139
Westinghouse Elec. & Mfg.	71¼	65⅛

The final shipment of the order for 2,600 freight cars for the Russian government has been made from the Berwick, Pa., plant of the American Car & Foundry Co.

Business News of Nation's Capital

Senator Weeks Makes Vigorous Attack on Armor Plate Bill—Reopening of Slag Tariff Question Requested

ATTACKS on the administration bill proposing a government owned armor plate plant have been voiced in the senate by Senator Weeks, who delivered an address on the subject last Thursday; by Senators Lippitt, Penrose, Wadsworth, Sutherland and Oliver. Senator Swanson spoke in favor of the measure.

Those opposing the measure assailed the report of the senate committee on naval affairs, urging its passage. They claimed that the entire armor plate question, despite the numerous investigations held with regard to it, has not developed anything like adequate information on the subject, and that the report is unfair and does not accurately reflect the situation as it exists. It was pointed out by Senator Weeks, in an unusually able address, that a government plant will not lower the cost of manufacturing armor for the government, but rather will increase it, and that, instead of destroying the property of its citizens, the government should co-operate with them, determining a policy on which can be asked a reasonable profit, which itself shall be based on the probable cost for an output to be continued through a term of years.

"I cannot help deprecating the tone used in dealing with the witnesses who came before the committee," said Senator Weeks. "These witnesses, representing the plants now equipped to manufacture armor, declined to expose the cost of manufacture unless the information was to be considered confidential. In taking that course, they were undoubtedly within their rights, because no manufacturer, under any laws of the United States, is required to take such action. The trade commission, under laws which are now on the statute books, has the right to go into these plants and make examinations, if it is considered confidential, so that if this committee had really desired the information, in order to guide its own action in coming to a conclusion, it could have obtained it in that way. It is a little humiliating when men, who I assume are reputable and responsible, are interrogated as these witnesses were in this manner."

Mr. Weeks said that this government pays less for its armor than any other government and that only one nation, Japan, has its own government plant, and produces armor at a cost of $490 per ton, while heavy armor is sold to this government for $420. Senator Weeks said Japan had to build its own plant because private capital then would not invest in such a hazardous undertaking. He also went into the matter of cost and riddled extravagant claims so promiscuously made about "excessive profits" enjoyed by the armor manufacturers of the United States. The three armor-making plants in this country, he said, have had only an average order for the last 16 years of 12,000 tons a year.

"Their capacity is 30,000 tons a year," said Senator Weeks. "In other words, they have been working two-fifths of their capacity, and I very much doubt if there is a senator here who can bring a single instance of a manufacturing plant that can make any profit working at two-fifths its capacity."

Embargo Inquiry

Washington, March 21.—Copies of all rules and regulations governing the distribution of cars, and copies of all embargo notices in force at the present time have been asked for from the railroads by the interstate commerce commission in an attempt to aid the railroads in relieving the freight congestion at Atlantic seaboard terminals and the shortage of cars in the west. After the replies of the railroads are analyzed by the commission, the next move will be made, but it is probable several weeks will be devoted to this work.

Attacks Slag Tariff

Washington, March 21.—Attacking the slag tariff filed with the interstate commerce commission as being illegal, and claiming that developments since the commission handed down its decision in the slag rate case warrant it, reopening of the question is asked of the commission in a brief filed with it last week. The brief was filed by Charles S. Belsterling, commerce counsel for the United States Steel Corporation, on behalf of the National Tube Co., the Carnegie Steel Co., the American Steel & Wire Co. and the American Sheet & Tin Plate Co. The brief asserts that the railroads use the slag for the improvement of their own properties, the amount that is wasted being negligible, and that the carriers should not be allowed to charge for material used for their own benefit. The present rate is 20c per ton. Investigation of the question as to interstate rates was taken up by the railroad commissions of West Virginia, Ohio and Pennsylvania shortly after the interstate commerce commission rendered its opinion.

Numerous examples are set forth to support the claim that the railroads benefit greatly from use of the slag. It is figured that the Pennsylvania Railroad Co., for instance, made a profit of $1,021,861 in 1915 by reason of the slag being turned over to it, if it used no more in that year than it did in 1913. The slag for building purposes, it is asserted, cost the railroad $442,205 less than an equal amount of other filling material.

"To determine the value of the slag by enforcing the terms of the present tariff in the courts would involve a multiplicity of suits," says the brief. "In every case where the slag is used petitioners are entitled to compensation from the railroad companies for its value. If the slag is appropriated to the railroad's own use and beneficial enjoyment, the industry is entitled to demand a price, and that price is predicated upon the particular use to which the slag is put. Neither lawfully nor practically can the price be fixed by tariff. Its value is determined by the cost of equivalent excavated material."

Orders Artillery

Washington, March 21.—The war department last week closed contracts with the Bethlehem Steel Co. for the construction of some 6-inch field artilleery guns and carriages, two 6-inch howitzers and 23 6-inch howitzer carriages and limbers. The government arsenals are so crowded with this kind of work that it was necessary to place contracts with the private concern, as is allowed by law.

New Uses for Many Steel Products

Are Shown at the Eight Annual Display of Railway Appliances at Chicago—
Indications That Heavy Buying Will Continue

WITH 150 exhibitors, the annual display of railway appliances is being held in Chicago under the auspices of the National Railway Appliances Association. It is simultaneous with the seventeenth annual convention of the American Railway Engineering Association, sessions of which are at the Congress hotel.

The exhibit of appliances fills the Coliseum and annex, forming a comprehensive presentation of the latest things in railroad equipment, indicating to those in touch the advance of the past year in railroad appliances and emphasizing the importance of the railroads to the iron and steel world.

Perhaps in no other line of activity is steel involved to so large a degree. In fact, in every department this material is coming into greater importance, displacing others from positions they have held securely from the beginning of steam traction until recently. In the construction of cars, in steel ties and in reinforced fence posts and wire fence, wood is being pushed back by steel, because of increased cost of lumber and greater permanence of steel.

No unusual appliances have been produced in the past year, but general advance in refinement of everything used by railroads has continued and everything seems somewhat better fitted to its uses than in the past.

The exhibit serves as a most instructive adjunct to the sessions of the engineering association, the matters treated there somewhat in the abstract being shown in the concrete in the various booths.

Two departments seem to assume most importance as the exhibition is viewed in general. One is the department of signaling and safety, which is concerned with electrical appliances, but involves large use of steel in construction. The other is the showing of rails and track fastenings, switches and frogs, which make up a large portion of the whole show.

In addition to these more prominent classifications, are exhibits by concrete concerns, culvert makers, hoist and pump makers, malleable iron founders, steel tie manufacturers, bridge builders, wire and cable makers and builders of rolling stock, including small service cars propelled by gasoline or storage batteries. In fact, it is difficult to imagine anything needed by railroads that is not represented.

The Carnegie Steel Co. has large space, devoted to showing its rails, its steel ties and sheet piling. The steel tie has been gaining in favor since the Steel Corporation has been using it so generally on its own railroad properties and as a substitute for extensive wooden ties its merits are being pushed.

The Lackawanna Steel Co. is showing its large assortment of standard rail and its sheet piling which has been made a feature of its output for several years.

The American Steel & Wire Co. shows railroad fencing and other materials fabricated of wire especially for this use.

The Pennsylvania Steel Co. has an exhibit of frogs and switch stands with other appliances which it has developed for railroad use. The National Malleable Castings Co., which supplies large tonnages of railroad devices, has a booth in which to entertain its friends and keep its product before the buyers.

The American Rolling Mill Co. has an exhibit of its iron culverts in a large range of sizes. The Chicago Pneumatic Tool Co. presents an assortment of tools for utilizing compressed air as power in working steel and iron in shop and on the road.

In the annex are a number of exhibits of interest, some of which are of a more general nature, with a particular application to railroad use. Here are placed the lumber associations, cypress and pine. Here also is found the exhibit of the Associated Manufacturers of Malleable Iron, designed to present the claims of malleable iron manufacturers to consideration in choosing supplies for car building and other departments of railroad work.

Scattered over the hall are numerous exhibits of specialties. These include safety rail joints, special lock nuts and washers, devices to check creeping of rails, rail anchors, fire extinguishers and storage batteries.

The Ayer & Lord Tie Co. has a booth in which the claims of creosoted ties and timbers are set forth as applied to railroad work.

The exhibit opened Monday, March 20, and continues through Thursday, March 23, being open each day from 8 a. m. to 10 p. m. In connection with the exhibit, the spring meeting of the Railway Signal Association and the Association of Railway Telegraph Superintendents is being held.

One matter of prime importance this year, which has been discussed earnestly, is the difficulty in obtaining steel and iron materials in the present congested condition of mills. While most manufacturers have been fairly well covered by early buying, there is some difficulty in meeting full needs. No real embarrassment has been met, but all manufacturers are seeking to discover what they can of the future and what their prospects are of keeping up their supply for later needs.

Prices of material are much higher, but most of the material now being manufactured into finished products was bought before present levels were reached. With the evident effort of steelmakers to meet every demand as far as possible the trade feels it is getting all it can expect under the circumstances and that delay is to be expected.

Every indication is that buying will be heavy all this year of rolling stock, rails and everything that goes into railroad work. For some time preceding the latter part of last year, railroads bought sparingly and the demand now seems cumulative, seeking to make up in some degree for the slack buying of the past. In fact, signs point to a continuation of demand from railroads for several years. Many extensions planned some time ago and allowed to remain quiescent during the lean years now are being brought to the front since financing can be done more readily and these will call for large tonnages of material which will be spread over a considerable period and give the market a strong backbone far into the future.

Railroad men at the meetings are filled with enthusiasm for the future and find the only drawback consists of delays met in obtaining materials promptly.

Philip W. Moore, of the P. & M. Co., Chicago, is president of the

association; H. M. Sperry, of the General Railway Signal Co., Rochester, is vice president; C. W. Kelly, of the Kelly-Derby Co., Chicago, is treasurer; Norman M. Hench, of the Carnegie Steel Co., Pittsburgh, is honorary director, and the other directors are the following: E. H. Bell, The Railroad Supply Co., Chicago; J. Alexander Brown, Pocket List of Railway Officials, New York; E. E. Hudson, Thomas A. Edison, Inc., Orange, N. J.; M. J. Trees, Chicago Bridge & Iron Works, Chicago; P. C. Jacobs, H. W. Johns-Manville Co., Chicago; R. C. McCloy, Wm. Wharton, Jr., & Co., Philadelphia.

The following are exhibitors at this year's show:

Adams & Westlake Co., The, Chicago.
American Guard Rail Fastener Co., Philadelphia.
American Hoist & Derrick Co., St. Paul, Minn.
American Kron Scale Co., New York.
American Steel & Wire Co., Chicago.
American Valve & Meter Co., Cincinnati.
Armco Iron Culvert Mfgs., Middletown, O.
Associated Mfgs. of Malleable Iron, Cleveland.
Ayer & Lord Tie Co., Inc., Chicago.
Automatic Electric Co., Chicago.

Ballow Safety Rail Joint Co., Roanoke, Va.
Barrett Manufacturing Co., New York.
Boss Nut Company, Chicago.
Bryant Zinc Co., Chicago.
Buda Co., The, Chicago.

Carnegie Steel Co., Pittsburgh.
Chicago Malleable Castings Co., Chicago.
Chicago Pneumatic Tool Co., Chicago.
Chicago Railway Signal & Supply Co., Chicago.
Cleveland Frog & Crossing Co., Cleveland.
Clyde Iron Works, Chicago.
Commercial Acetylene Railway Light & Signal Co., New York.
Concrete Mixing & Placing Co., Chicago.
Crear-Adams & Co., Chicago.
Cast Iron Pipe Manufacturers, Chicago.

Daniels Safety Device Co., Chicago.
Detroit Graphite Co., Detroit.
Dillworth-Porter & Co., Ltd., Pittsburgh.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Duff Manufacturing Co., The, Pittsburgh.

Edison, Thos. A., Inc., Bloomfield, N. J.
Edison Storage Battery Co., Orange, N. J.
Electric Storage Battery Co, The, Philadelphia.
Electric Ry. Improvement Co., Cleveland.
Eymon Continuous Crossing Co., Marion, O.

Fairbanks, Morse & Co., Chicago.
Fairmont Gas Engine & Railway Motor Car Co., Fairmont, Minn.

General Electric Co., Schenectady, N. Y.
General Railway Signal Co., Rochester, N. Y.
Gurley, W. & L. E., Troy, N. Y.

Hall Switch & Signal Co., New York.
Hatfield Rail Joint Mfg. Co., Macon, Ga.
Hayes Track Appliance Co., Richmond, Ind.
Hazard Mfg. Co., Wilkes-Barre, Pa.
Hubbard & Co., Pittsburgh.

Indianapolis, Switch & Frog Co., Springfield, O.
Ingersoll-Rand Co., New York.
International Steel Tie Co., The, Cleveland.

Johns-Manville Co., H. W., New York.
Joyce-Cridland Co., The, Dayton, O.
Jeager Machine Co., Columbus, O.

Kalamazoo Ry. Supply Co., Kalamazoo, Mich.
Kellogg Switchboard & Supply Co., Chicago.
Keystone Grinder & Mfg. Co., Pittsburgh.
Kilbourn & Jacobs Mfg. Co., Columbus, O.

Lackawanna Steel Co., Lackawanna, N. Y.
Morden Frog & Crossing Works, Chicago.

National Lock Washer Co., Newark, N. J.
National Malleable Castings Co., Cleveland.
Northwestern Motor Co., Eau Claire, Wis.

O'Malley Beare Valve Co., Chicago.

Pennsylvania Steel Co., Philadelphia.
Pittsburgh-Des Moines Steel Co., Pittsburgh.
Peyton Safety Rail Joint Co., Centralia, Ill.

Q. & C. Co., The, New York.

Rail Joint Co., The, New York.
Railroad Supply Co., The, Chicago.
Ramapo Iron Works, Hillburn, N. Y.
Reading Specialties Co., Reading, Pa.

Sellers Manufacturing Co., Chicago.
Simmen Automatic Ry. Signal Co., Buffalo.
Standard Underground Cable Co., Pittsburgh.

Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
Track Specialties Co., New York.

Union Switch & Signal Co., Swissvale, Pa.
U. S. Wind Engine & Pump Co., Batavia, Ill.

Verona Tool Works, Pittsburgh.

Wayne Oil Tank & Pump Co., Fort Wayne, Ind.
Western Electric Co., New York.
Wharton, Wm., Jr. & Co., Inc., Philadelphia.

Yale & Towne Mfg. Co., New York.

Will Not Have Spring Meeting

Worcester, Mass., March 20. — The National Machine Tool Builders' Association has given up the idea of having its fourteenth semi-annual convention in Cincinnati in April or May, and none will probably be held anywhere. After that city gave it up there was some talk of having it at Atlantic City, where it was last May, but the officers decided it was not feasible and have practically decided not to have one this year. Should an emergency arise that would require a meeting, President J. B. Doan will call a special one to take the place of the Cincinnati meeting. There are several reasons for not having the Cincinnati convention this year, chief among them being the fact that so many of the members are rushed with orders growing out of the European war. Most of them do not want to spare the time that it will take to go to a convention. The annual convention in October, will probably be in New York City.

Great Opportunity

An exceedingly interesting pamphlet on "Russia, America's Greatest Export Opportunity", has just been published by R. Martens & Co., Inc., 24 State street, New York City. The pamphlet tells of the wonderful progress that has been made by Russia, especially in the acquiring of land by former serfs. It is predicted that the Russian people will be aroused by the war so that their activities will be greatly increased and their needs multiplied. Hence there will be a great demand for American products. Whether or not any American manufacturer can profitably export his product to Russia can be decided only by careful consideration of his product and its use in Russia. R. Martens & Co. endeavor to help manufacturers in reaching this decision.

Benzol Market

Is Somewhat Easier Owing to the Resale Offering

New York, March 21.—Easier market conditions for spot shipment are to be noted in commercial benzol and some other coke-oven by-products, due to resale offerings by various consumers who now are marketing some of their purchases. In commercial benzol, this selling has been occasioned by the delay of these consumers in getting in operation new plants in which they were to use this product in manufacturing. The situation, therefore, is a temporary one. Resale prompt benzol was sold the past week at below 90 cents per gallon at the maker's plant, the latter being the price quoted by regular sellers. The offerings of supplies of tuluol for immediate delivery have been larger, but there has been no variation in price. Contract commercial benzol and tuluol are stronger than ever, with the demand far in excess of the supply. A considerable part of this demand is for export, but the domestic requirements are well ahead of the foreign volume. Contract prices on benzol and tuluol are nominal and unchanged. In solvent naphtha, buyers' requirements are being well filled and supplies also have been pretty thoroughly cleaned up. Prices are unchanged.

Some users of sulphate of ammonia having overbought their needs as the expected demand for fertilizers has not developed, have been reselling some of their supplies and the market has weakened. First sellers are meeting the lower prices. The market now is quoted at $3.55 to $3.60 per 100 pounds, at tidewater, as against $3.61 to $3.66 a week ago. The volume of present trading is disappointing.

The current quotations per gallon at the maker's plant on leading coke oven by-products are as follows:

Commercial benzol, spot	$0.85 to .90
Commercial benzol, contract	.70 to .75
Tuluol, spot	5.00
Tuluol, contract	4.50 to 4.75
Solvent naptha, spot	.45 to .50
Solvent naptha, contract	.40 to .45

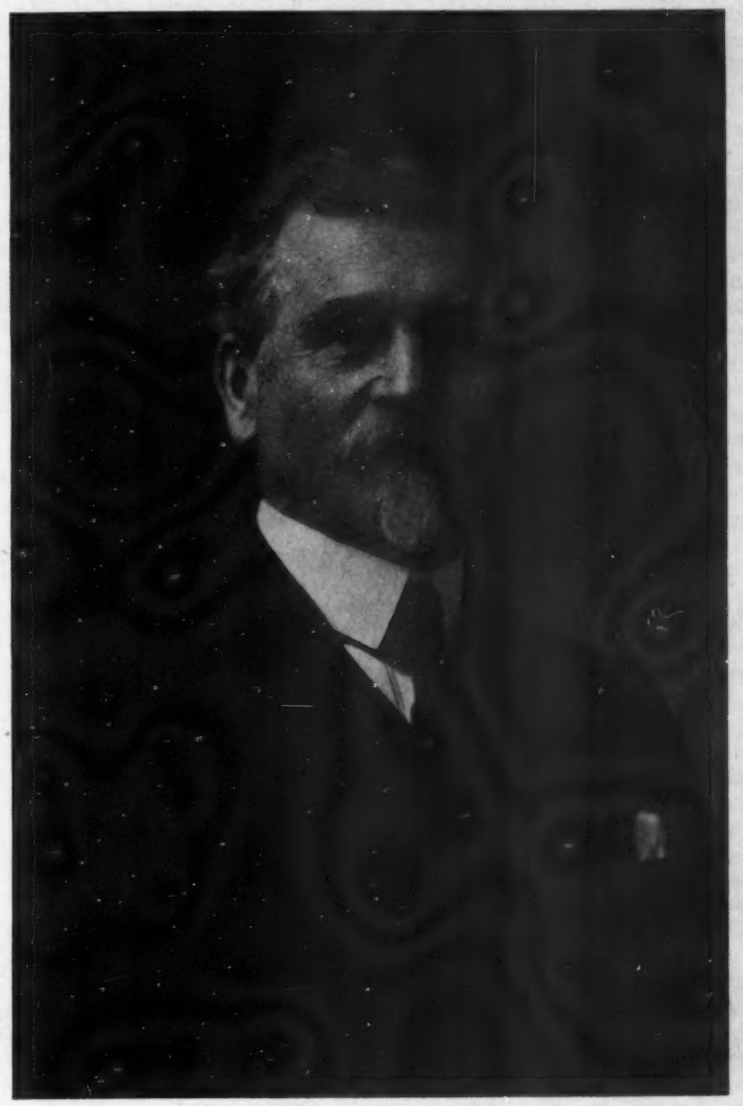
Sulphate of ammonia is $3.55 to $3.60, per 100 pounds at tidewater.

Lewis R. Lukens, dealer in concrete reinforcing steel, bar iron and soft steel bars, has removed his warehouse from Conshohocken, Pa., to 2215-17 Race street, Philadelphia. His office has been removed to that location from 44 Real Estate Trust building. Mr. Lukens is a representative in Philadelphia territory of the Franklin Steel Co., Franklin, Pa.

Capt. Hiram S. Chamberlain Called by Death--His Long and Honorable Career

IN THE death of Capt. Hiram S. Chamberlain, which occurred at his home in Chattanooga, Tenn., March 15, there passed a man who as a soldier, manufacturer and citizen had served his country, his state and his city with patriotism and great ability. The end came after an illness of about a month.

Capt. Chamberlain was born Aug. 6, 1835, on a farm near Franklin, Portage county, O. At 17, he entered the Eclectic Institute, afterward Hiram College, at Hiram, O., remaining there for five years. The president of the college at that time was James A. Garfield, afterward President of the United States. After a short period of residence in Iowa, Mr. Chamberlain returned to Ohio and for several terms taught school.



HIRAM S. CHAMBERLAIN

At the outbreak of the civil war, he volunteered as a union soldier, was assigned to the second Ohio cavalry and served with it for two years in rough campaigning in Kansas and Missouri. He was rapidly promoted and after being made a first lieutenant, was transferred to Knoxville, Tenn., in the fall of 1863. He was then promoted to be captain and assistant quartermaster of volunteers. Early in 1864, the young officer assisted in fitting out the twenty-third army corps, General Schofield commanding, for the Chattanooga campaign. Just before the end of the war, he became chief quartermaster to General Stoneman, who had been assigned to the command of a cavalry force, whose operations were brought to an abrupt close by the surrender of General Lee and General Johnston. Captain Chamberlain then returned to Knoxville, where he was mustered out in 1865. Anxious to do all in his power to heal the wounds of the civil strife, and believing in the future of the state of Tennessee, Capt. Chamberlain decided to remain in Knoxville. He organized the firm of Chamberlain, Richards & Co., for the operation of a small rolling mill. In 1867, the firm was reorganized as a stock company, with Capt. Chamberlain as president. This was the predecessor of what is now the Knoxville Iron Co., of which he was vice president at the time of his death. In 1868, with General John T. Wilder, he organized the Roane Iron Co., which purchased large tracts of coal and iron lands and engaged extensively in other developments, as well as in building blast furnaces and coke plants. These two men were the first blast furnace operators to use coke as fuel south of the Ohio and Potomac rivers.

In 1870 the Roane Iron Co. bought the Chattanooga works of the Southwestern Iron Co. In 1871 Captain Chamberlain was elected vice president and general manager of the Roane Iron Co., which had enlarged the Chattanooga purchase and had abondoned the name "Southwestern". He removed to Chattanooga, where was located the headquarters of the Roane Iron Co., and remained a resident of that city to the day of his death. In 1882 he, with Edward Doud, organized the Citico Furnace Co., one stack, and was its president. For 45 years he was identified with the industrial and commercial progress of Chattanooga. He was vice president for 30 years of the First National bank, was a director of the Dixie Portland Cement Co., the Chicamauga Trust Co., the Brookside Cotton Mills, of Knoxville, and of various other corporations of Chattanooga and eastern Tennessee. He also played an important part in the civic and educational life of his city and state, being president of the city's school board for many years, president of the board of trustees of the University of Chattanooga, for a quarter of a century of the Associated Charities of the city and a founder and original trustee of Erlanger hospital. He was a member of the American Institute of Mining Engineers, a beloved member of the American Iron and Steel Institute at whose annual meetings he always was an honored figure; a member of the American Association of Manufacturers; and also he was a mem-

ber of every commercial and industrial body in his city. He was a member of the Grand Army of the Republic and of the Ohio commandery of the Loyal Legion. In 1898 he was given the honorary degree of M. A. by Hiram college, and in 1910 the degree of LL. D. by the University of Chattanooga.

In every movement that made for the upbuilding of his state and his country, Captain Chamberlain took an earnest and active part. Always a firm believer in the American doctrine of protection to home industries, he made many a powerful argument before congressional committees in advocacy of that national principle that has resulted in the upbuilding of America's great industries. His letters in support of his oral testimony always were read with profound attention as they deserved.

Col. Alfred Hicks, 79 years old, coal operator, steel manufacturer and financier, died recently at his home in Pittsburgh. He founded the Allegheny Steel & Iron Co. and was president of the Interstate Steel Co. of Pittsburgh and had been connected with 20 coal companies. Col. Hicks was born in Cardiff, Wales.

John Watson, president of the John Watson & Sons Co., Inc., died at his home, 330 South Warren street, Trenton, N. J., March 15, after a long illness. He had been engaged in the manufacture of machinery in Trenton since 1864 and had several patents on his product. During the Civil War he was superintendent of the toolmaking department of the old Cooper-Hewitt Iron works, where guns for the Union army were manufactured.

Charles M. Hewitt, president of the Hewitt Co. and the Magnus Co., both manufacturers of railroad supplies, died at Palm Beach, Fla., March 16, after being in ill health for several years. He removed from Detroit to Chicago in 1883 and became manager of the Pullman company. After two years, he started in business for himself and was eminently successful. He was 59 years old.

E. Howard Smith, general manager of the Superior Supply Co., Bluefield, W. Va., died recently, aged 52 years. He was born in Richmond, Va., and was first employed by the Smith-Courtney Co. of that city, and afterwards was connected with the Miller Supply Co. of Huntington, W. Va., with which concern he remained until he became general manager of the Superior Supply Co. in 1904. This position he held until the time of his death, and in addition has been president of Sterling Hardware Co., Bluefield, W. Va., for the past three years.

Motor Trucks

Machine Tools and Zinc Prominent in Export Movement

Iron and steel imports for January, as reported by the bureau of statistics of the department of commerce, amounted to 15,824 tons, compared with 10,570 tons in January, 1915. Iron ore imports for January were 89,844 tons, of which 63,656 tons came from Cuba.

Exports for January were almost the same as for December in articles reported by tonnage. In exports of machinery, the December movement of motor trucks and agricultural implements was about the same as for November, but the value of metal working machinery exported in December was only $3,205,788, compared with $4,644,713 in November. The total exports of machinery for December were $12,270,051, compared with $6,372,041 in December, 1914. Exports of zinc, except ore and dross, were valued at $3,610,885 in December, 1915, and $2,351,191 in December, 1914.

IMPORTS AND EXPORTS.

	Imports, gross tons.	Exports, gross tons.
July	20,858	378,890
August	27,556	405,850
September	23,345	381,914
October	34,730	351,039
November	37,131	362,764
December	35,456	353,836
January	15,824	354,416

IRON ORE IMPORTS, GROSS TONS.

	January.		Seven months end'g January,	
	1916.	1915.	1916.	1915.
Spain	11,050	5,193	26,134	46,115
Sweden	7,001	7,067	120,110	117,533
Canada	1,833	138	81,898	36,431
Newfoundland & Labrador	.....	.....	.....	17,500
Cuba	63,656	54,850	538,539	454,016
Oth. countries.	6,304	8,038	112,873	46,014
Total	89,844	75,286	879,554	717,609

IRON AND STEEL IMPORTS, GROSS TONS.

	January,		Seven months end'g January,	
	1916.	1915.	1916.	1915.
Scrap	4,596	2,384	70,934	21,406
Pig iron	9,422	2,990	66,864	80,179
Ingots, blooms, billets of steel.	584	2,016	8,849	19,827
Wire rods	26	342	2,575	2,382
Rails	455	305	38,425	14,842
Bar iron	369	551	4,803	8,148
Structural	164	316	740	4,936
Sheets & plates.	146	58	953	2,005
Tin & terne plt.	62	1,608	343	4,290
Total	15,824	10,570	194,486	158,015

EXPORTS OF MACHINERY.

1915.	Motor trucks.	Agricultural implements.	Aeroplanes.	Metal working machy.
Jan.	$2,545,527	$429,745	$71,315	$2,903,740
Feb.	3,022,482	762,606	6,000	2,523,722
Mar.	4,725,563	1,567,327	89,450	3,863,913
Apr.	5,240,481	1,534,715	318,492	3,300,953
May	6,583,912	1,711,379	83,950	3,762,567
June	8,578,802	854,670	283,212	3,735,562
July	6,803,001	963,534	880,836	3,872,358
Aug.	4,387,193	1,454,606	588,600	3,624,411
Sept.	5,882,255	1,092,797	101,950	3,256,973
Oct.	4,307,190	791,230	366,892	3,236,079
Nov.	3,837,307	1,054,235	13,770	4,644,713
Dec.	3,920,533	1,338,629	156,347	3,205,788

For the calendar year 1914, there were 3,430 motor trucks exported, valued at $8,985,756, while in the year 1915, 22,082 motor trucks valued at $59,834,246 were exported. In metal working machinery, including machine tools, exports were valued at $42,037,779 and $14,841,380, respectively, in 1915 and 1914. The value of agricultural implement exports declined sharply in 1915, the figures for the past three years being as follows: 1915, $13,555,473; 1914, $21,649,523; 1913, $53,453,643. Exports of zinc, except ore and dross, were valued at $33,504,908 for 1915, while in 1914 the value was only $8,751,576, and in 1913, $1,101,651.

Waiting List

Has Been Established by American Iron and Steel Institute

Applications for membership in the American Iron and Steel Institute have continued to exceed the limits fixed on both the active and associate classes and a waiting list now has been established. At the recent meeting of the directors, 17 applications for membership were presented, but there were only 10 vacancies, one in the active and nine in the associate lists. One member, temporarily on the associate, was transferred to the active list and the 10 vacancies on the associate list then were filled by election. This meant the necessity of placing seven of the applicants on the waiting list. The election of members from this time is to be made in the chronological order of their application or alphabetically where two names were filed on the same date. The new members recently elected are as as follows:

Beale, Harry S., eastern sales manager, Blaw Steel Construction Co., 165 Broadway, New York City.

Beegle, Frederick N., president, Union Drawn Steel Co., Beaver Falls, Pa.

*McCloy, John Howard, salesman, La Belle Iron Works, Steubenville, O.

McIlravy, W. N., vice president, American Coal Products Co., 17 Battery Place, New York City.

*Manthe, J. Lester, assistant superintendent, blast furnaces, National Tube Co., McKeesport, Pa.

*Pendleton, Hugh N., superintendent, skelp mill, National Tube Co., McKeesport, Pa.

*Snyder, William T., superintendent, electrical department, National Tube Co., McKeesport, Pa.

Stoddard, Harry G., vice president and general manager, the Wyman-Gordon Co., Worcester, Mass.

Todd, William B., assistant general manager of sales, Union Drawn Steel Co., Beaver Falls, Pa.

*Valentine, Sterling G., superintendent, Oxford furnace, Empire Steel & Iron Co., Oxford, New Jersey.

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*Placed temporarily on associate list, to be transferred to active list as vacancies occur.

News of Employers and Employes

Boston Has Two Strikes and Others Threatened—Elaborate Plan of Welfare Work at Chicopee Falls, Mass.

BOSTON, which has been comparatively free from strikes of any consequence in the metal trade industry for a long time, now has a couple on its hands with others threatened. Each involve about 400 machinists, though they have no connection with the proposed 8-hour campaign of the machinists union which does not become effective until May 1 in New England. The Taylor efficiency system is blamed for one of the strikes—that at the Reece Buttonhole Co., Harrison avenue, where 400 machinists have walked out. Many of the men who went out were not affiliated with the labor movement, but joined the union after they had struck. The other strike was in the drill press department of the American Steam Gauge & Valve Co., which has big contracts for making war munitions for the allies. Officers of the union claim that 400 employes are out, 200 of whom, they say, have joined the union, while officials of the company state that 75 men have been laid off indefinitely. The strike was for an increase in pay, a demand being made for five cents an hour more in all departments of the plant.

The only other strike in Massachusetts last week was at the big plant of the Fisk Rubber Co., in Chicopee Falls, where 114 machinists and 15 blacksmiths walked out because 20 men engaged in making machinery had been laid off.

The 27 machinists employed by the Atkinson, Haserick Co., Worcester, Mass., have made a demand for a 9-hour day with 10 hours pay. The company says it is impossible to meet their demands.

Industrial Relation Department

An elaborate plan of welfare work, providing benefits for sick employes and liberal life insurance, will be placed in operation in the plant of Fisk Rubber Co., Chicopee Falls, Mass., April 1. The proposition will require a well-organized department to conduct its administration. There will be, in addition to the supervisor, Dr. William Hall Coon, an assistant physician, social visitor, nurses, visiting nurses, an employment officer and assistants, safety inspectors and other assistants. Better hospital service will be given, free legal advice can be had where it may be necessary, and a sick benefit will be in operation which will cover every employe of the factory and office. This benefit will be $1 a day and will be for both men and women alike without expense to them. As a reward for continuous service, a life insurance policy of $500 with no cost will be given to all employes in the service of the company for a year. This will be increased $100 each year for five years until the face value of the policy has reached $1,000. The new department will be known as the industrial relation department. The policy will remain in force as long as the insured continues in the employ of the company.

Loyalty and Perfection

Sheboygan, Wis., March 21.—The Kohler Co., Kohler, Sheboygan county, Wis., a large manufacturer of enameled sanitary ware and plumbing supplies, has introduced a bonus system based on perfect attendance at work by employes, from shop hands to executives. Each employe will be given a bonus of 10 per cent of the monthly wage or salary for a perfect attendance during the month, the bonus being payable on the 25th of the month following. The Kohler company has also announced to its force that beginning March 1, promotions to positions of importance in the organization of the company will be given only to those who are native-born or naturalized citizens of the United States, or to those of foreign birth who have relinquished their foreign citizenship. Employes who still retain their foreign citizenship will not be discriminated against in their present positions or work, but they will not be promoted to positions of responsibility or trust, the order says. "A prerequisite to employment by this company must be loyalty to our government and our flag, in addition to loyalty to the company itself," said Walter J. Kohler, president.

New Jersey Strikes

New Brunswick, N. J., March 21.—Union machinists are on strike here and several plants are affected by the walkout. The strike was declared by National Organizer Hugh V. Reilly. The men are asking for an 8-hour day. The Simplex Automobile Co. and the John Waldron Foundry are the only plants thus far that have granted the demands.

The strike at the C. Pardee works at Perth Amboy has been settled, the company refusing to grant the demands of the 350 strikers for an increase in pay. The company recently voluntarily granted a small increase in pay. The strike of the employes of the Gabriel & Schall Chemical works at New Market has also been settled.

Wiredrawers at the Roebling, N. J. plant of the John A. Roebling's Sons Co., have returned to work after being on strike for two weeks. The company refused to grant the demands for an increase in pay.

The Welsbach Light Co., of Gloucester, N. J., has granted an 8-hour day with the same wages to its 2,500 employes. The company says that it believes shorter hours means better product.

The American Sawmill Co., of Hacketstown, N. J., has granted its foundrymen an increase of 10 per cent.

Employes of the American Ammunition Co., at Paulsboro, N. J., have been placed on the piecework system, causing them to earn larger pay.

Compensation Plan

Louisville, Ky., March 21.—Kentucky will shortly join the states which have workmen's compensation laws, a compensation measure advocated by both manufacturers and labor having passed the recently adjourned state legislature. It is practically compulsory, since it deprived employers who do not accept its provisions of common law defenses. It provides for insurance with commercial or mutual companies and does not seek to create a state fund.

Other legislation of interest to the steel and iron trade includes a law providing that corporations shall pay employes at least twice each month, laws increasing the authority of cities and towns, counties and graded school districts to borrow money for public works and a law which will permit corporations to erect and own apartment houses, etc., not used by them in the conduct of their business.

Seaboard Air Line Closes on List

Domestic Inquiry Slacking—Efforts Being Made to Secure New Shell Contracts—Norfolk & Southern Issues Big List—Mill Equipment Bought

OF chief interest in the machine tool market in the east is the distribution by the Seaboard Air line of the list of equipment on which it took bids at the end of February. This list which involved an aggregate expenditure of about $50,000 was divided among a number of concerns. Several other railroads have placed orders but outside of the Seaboard Air line business, there were no important purchases. It is expected, however, that considerable additional business will develop from these sources within the next few weeks. One railroad practically has completed a large list, which, it is understood, will be issued shortly for quick action.

The general domestic demand is of a scattered and small-lot character and there are practically no large orders to report. While inquiries from abroad continue, the demand from this source is of diminishing proportions; in fact, a number of important machine tool concerns report that the market as a whole is slightly less active than has been the case in preceding weeks. A feature of interest is the effort which is being made by a number of domestic concerns, which are devoting large portions of their capacity to the manufacture of munitions, to secure new contracts from the belligerent governments. These industries, having organized the manufacture of such materials in their plants in a thorough manner, are desirous of securing new contracts on which to engage after the present contracts have been filled. Such contracts, however, now are harder to get than at any time in the past. The Ingersoll-Rand Co. has booked, or is about to book, a contract involving 4.5 and 4.7-inch shells.

Prices on machine tools continue to move toward higher levels. Last week, further 10 per cent advances were declared effective by some makers of grinders and engine lathes, whose figures now are approximately 40 per cent higher than a year ago. Fears again are being expressed over possible future labor troubles. In some quarters it is believed another general strike movement on the part of machinists can be expected during the coming summer.

The American Smelting & Refining Co. has purchased a number of electric traveling cranes, some for shipment to South America. The Pennsylvania railroad has placed orders for two 200-ton hoists. The Alliance Machine Co. will furnish one 20-ton crane for Samuel Moore & Sons Corporation, Elizabeth, N. J. The Birmingham Iron Foundry, Derby, Conn., has bought five Niles cranes and the Crane Co., Chicago, 13 Niles cranes.

Among eastern concerns who are expanding, or shortly will expand, their capacity, are the Niagara Searchlight Co., Niagara Falls, N. Y.; W. J. Murphy Co., Amesbury, Mass.; Brown & Sharpe Mfg. Co., Providence, R. I.; Beaton & Cadwell Mfg. Co., New Britain, Conn.; United States Metals & Refining Co., Roosevelt, N. J.; Friction Hinge Co., Williamsport, Pa.; Grander Stove Co., Royersford, Pa.; W. S. Rockwell Co., 50 Church street, New York; Valley Iron Works, Williamsport, Pa.; Pratt & Whitney Co., Hartford, Conn. and the Eagle Lock Co., Terryville, Conn.

Chicago Engineering Firm Will Buy Heavily

MACHINE tool dealers in Chicago find a continuance of inquiry and the same lack of material to satisfy it. The embargo in the east seems to have given some machine builders opportunity to make shipments to western buyers in place of supplying eastern markets where railroads cannot make delivery. Some makers are promising June and July delivery, while others cannot give better than late fall and early winter. Buyers desiring full equipment for new plants cannot fill all their needs in any one place, but are forced to shop about and pick up occasional tools here and there. The equipment of the Truscott-Racine-Lake Boat Building Co., Muskegon, Mich., which has been in the hands of receivers for some time, will be disposed of shortly. Much desirable material is included in the equipment. The Norfolk & Southern railroad, Norfolk, Va., is inquiring for equipment for new shops, the buying to be done through a Chicago engineering firm. The list is presented on page 675.

Buying Heavy Mill Equipment in Pittsburgh

UNPRECEDENTED inquiry for heavy rolling mill equipment continues to feature the Pittsburgh market. The National Tube Co., Pittsburgh, has ordered a 40-inch blooming mill, with tables, from the Mesta Machine Co., Pittsburgh, an electric motor, developing about 500-horsepower at 100 revolutions per minute from the Westinghouse Electric & Mfg. Co., East Pittsburgh, and a 3,000-horsepower gas engine for driving the blooming mill from the Allis-Chalmers Mfg. Co., Milwaukee, for installation in the extension to its plant at Lorain, O. The company will build four 80-ton open hearth furnaces. The United Engineering & Foundry Co., Pittsburgh, has taken an order for a 36-inch blooming mill for the Ashland Iron & Mining Co., Ashland, Ky. The Carnegie Steel Co., Pittsburgh, has closed for a double-end machine to cut 2-inch holes through 1-inch plates at one end and to shear plates at the other end for its Homestead works. The aggregate sales of punches and shears has been heavy. A number of builders of punching and shearing equipment have advanced prices 10 per cent since March 1, prevailing prices being about 25 per cent above those offered last July.

Cleveland Market Needs Tonic

THE machine tool market is reflecting the attitude of the conservative buyer. Six months ago quotations to a prospective purchaser carried a 6-month time clause, and the business was awarded if the machine was badly needed. Today the buyer who needs machines agrees to the long-time delivery only upon the stipulation that he be allowed the difference in price should that price revision be downward. There is a decided tendency on the part of buyers to feel out the market and to show skepticism with regard to future business. It has been noted that

OUR PRODUCTS

"AGATHON" Chrome Nickel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steels
"AGATHON" Special Analyses
"AGATHON" Vanadium
"AGATHON" Silico-Manganese
"AGATHON" Chrome Steel
"AGATHON" High Carbon

The Mark of DISTINCTIVE EXCELLENCE

The ancient Greeks were long on quality. In whatever they attempted they excelled. Much of their work still stands, and to the whole World is an example of the utmost skill and excellency.

The word the Greeks used to express this ultra-quality was "AGATHON."

As in the olden days "AGATHON" was resounded throughout all Greece, so today it is being resounded throughout all America, descriptive of a new steel—a steel of highest quality, so scientifically and carefully made that its manufacture is no less than an art.

Our buildings of the most modern construction, were designed for the one purpose of producing *quality*. Our entire equipment was selected piece by piece, for the same final result—*quality*. Our raw materials have to pass the *quality* test.

"AGATHON" is our watchword.

And behind these "Agathon" buildings, this "Agathon" machinery, and this "Agathon" material, is our splendid corps of "Agathon" men.

We have set a *higher* standard—because particular buyers *demand* a higher standard.

Let us serve you.

The Central Steel Company
MASSILLON, OHIO

Detroit Office: 326-27-28 Ford Bldg., F. Walter Guibert, District Representative
Cleveland Office: Hickox Bldg., The Hamill-Hickox Co., District Representative

builders are making even more strenuous efforts to supply dealers with all the machines they require in an effort to allay the suspicion existing that the future inquiry will not be so strong. There is no definite cause for this situation and many dealers and builders feel confident that there will be no price change for at least eight months. The Newburg & South Shore railroad has awarded some business on a list recently issued, but to what extent the requirements were filled is not known. Heavy planers and shears are in better demand and there is a good call for second-hand tools.

Cincinnati Firms Increasing Capacity

ORDERS for shipment of machine tools to European nations are almost a thing of the past, as machine tool builders in that city are showing a preference for domestic business, which is heavy at present. The R. K. LeBlond Machine Tool Co., the Cincinnati Gear Co., and the American Tool Works Co., all Cincinnati companies, are in the market for a large amount of equipment, as all are building new plants. The Ault & Wiborg Co. will erect a large factory building this spring, and will purchase special equipment, which will cost $250,000. The labor situation at Hamilton, O., has cleared up, and more machinists are at work at present than before the recent strike, which severely handicapped machine tool plants during the last half of 1915, and during January of this year. Inquiries continue heaviest for lathes. Large quantities of sugar machinery have recently been sold to Cuba and South American countries, thus opening a new field for enterprising American firms.

Among New England Factories

DIXVILLE, N. H.—The Dixville Notch Corporation will rebuild a 1-story, 56 x 72-foot boiler house which recently was burned.

PORTSMOUTH, N. H.—The Walter A. Wentworth Co., Boston, has been awarded a contract to build a factory for the Morley Button Mfg. Co.

WOODSVILLE, N. H.—A 3-story brick building owned and occupied by Earl F. Mulliken, was damaged by fire, causing a loss of $40,000.

NEWPORT, VT.—The Newport Electric Light Co. will build a steel and concrete 6 x 100-foot surge pipe.

AMESBURY, MASS.—The W. J. Murphy Co. will build a 3-story, 56 x 120-foot bronze factory.

BOSTON. — Herbert F. Winslow plans to erect a fireproof, 7-story, 61 x 91-foot building at 21-37 Portland street.

BOSTON.—Bids close April 6 for a stone addition to the central library building and the erection of a heating plant on Blagden street for the city at a total cost of $150,000.

BOSTON.—The Van Dorn Iron Works Co., Cleveland, is low bidder at $16,600 for installing counters and making repairs at the United States custom house.

BOSTON.—The Bachelder-Gallant Co. has been incorporated to make spark plugs; $10,000 capital stock; by E. R. Batchelder, John E. Gallant and J. F. Tilden.

BOSTON.—The Conqueror Zinc Co. has been incorporated; $100,000 capital stock; by H. M. Crawford, W. Loring Adams and R. C. Andrews.

BOSTON.—The Johnson Aviation Co., has been incorporated; $100,000 capital stock; by Isaac T. Johnson, W. R. Dorr and R. P. Timson.

BOSTON. — The National Elevator Guide Rail Lubricator Co., has been incorporated; $50,000 capital stock; by A. G. Carver, August L. Knudsen, Dorchester, and P. W. Carver.

BOSTON. — The Static Carbonating Co. of Boston has been incorporated; $50,000 capital stock; by Henry Carmichael, George R. Fiske and Walter F. Hayes.

BOSTON.—The Willys-Overland Automobile Co. will build a brick, steel and reinforced concrete fireproof, 8-story, 200 x 225-foot warehouse to cost $300,000. The contract will be awarded to the Leonard Construction Co., Chicago.

BOSTON.—C. A. Dodge Co., Cambridge, has been awarded contract to build a reinforced concrete fireproof, 4-story, 76 x 127-foot factory, to cost $100,000 for the making of auto bodies at Blanford and Cummington streets for Chauncey Thomas & Co.

CHARLESTOWN, MASS.—Work has been started on a brick, 1-story, 110 x 225-foot manufacturing building at 465 Medford street for the Merchants Terminal Co., Boston.

CONCORD, MASS.—The A. S. Lowden & Son has been incorporated to build machinery; $10,000 capital stock; by Andrew S. Lowden, South Acton, Arthur S. Lowden and R. L. Lowden.

FALL RIVER, MASS.—Fire damaged the rope factory of Small Bros. causing a $30,000 loss.

FALL RIVER, MASS.—The Foster Spinning Co. is to be incorporated with a capital stock of $275,000 and will build a brick, 2-story, 135 x 260-foot mill and a power plant on Cove street.

HOLYOKE, MASS.—Excavating work has started for a brick and steel, 2-story, 100 x 200-foot factory to cost $65,000 on Canal street, for the Cowan Truck Co.

MALDEN, MASS.—The Malden Gas & Electric Co. has let a contract for the erection of a 1-story, 35 x 45-foot meter building.

MALDEN, MASS. — The Converse Rubber Shoe Co., has awarded the contract for a steel, concrete, mill construction, 4-story, 50 x 200-foot storage building to cost $50,000, as an addition to its plant on Pearl street.

NEW BEDFORD, MASS.—The Old Colony Machine Co. has been incorporated; $10,000 capital stock; by Frank D. Ricketson, Charles O. Brightman and John D. Sharples.

NEWBURYPORT, MASS.—The American Tire Fabric Co. has let a contract for the erection of a 3-story factory building.

WESTFIELD, MASS. — The Bay State Foundry Co. has been incorporated; $25,000 capital stock; by William C. Waldron, Theodore R. Brien and Harry B. Putnam.

WORCESTER, MASS.—The Norton Co. has awarded a contract for a brick and steel extension to plant 6, as well as a 4-story, 60 x 178-foot building and a 2-story, 80 x 112-foot building as additions.

WORCESTER, MASS.—C. W. Blakeslee & Son, New Haven, Conn., are low bidders at $213,304.15 for building a 6-span, 855-foot, 70-foot wide concrete bridge over Lake Quinsigamond.

WORCESTER, MASS.—The Hi-Lo Jack Co. has been incorporated to make screw jacks; $150,000 capital stock; by J. Howard Joynes, Amos F. Lanier and George B. Hurlburt. It will establish a drop-forging plant at 140 Green street.

WORCESTER, MASS.—The Worcester Electric Light Co. has voted to increase its capital stock from $1,400,000 to $1,800,000 to provide for extensions at its Webster street power plant.

PAWTUCKET, R. I.—The Frank G. Rowley Co. has been awarded a contract for a brick, 2-story, 60 x 200-foot mill and a 1-story, 20 x 41-foot boiler house to cost $30,000 by the Rhode Island Textile Co.

PROVIDENCE, R. I.—The Flint Motor Parts Co. has been incorporated; $30,000 capital stock; by Daniel J. Healey, James F. Padien and James E. Brothers.

PROVIDENCE, R. I. — The Brown & Sharpe Mfg. Co. has let a contract to the Aberthaw Construction Co., Boston, for the erection of a 6-story and basement, 50 x 135-foot factory-building with a 40 x 50-foot ell.

PROVIDENCE, R. I.—David J. Barry has been awarded a contract at $139,000 for a brick, 3-story and basement, 62 x 180-foot with an ell, 35 x 75-foot grammar school building for the city on Charles street.

PROVIDENCE, R. I.—The West Shore Water Co. will be incorporated with a capital stock of $800,000 by Edward W. Shedd, Harold W. Thatcher and Edward G. Fletcher to establish a water works system in Warwick.

PROVIDENCE, R. I.—The Gorham Mfg. Co., which is making munitions, has awarded a contract for a brick, 1-story, 46 x 120-foot factory addition to cost $35,000, and to be completed in 30 days.

PROVIDENCE, R. I.—The Beeman & Smith Co., machinist and machinery maker, has awarded a contract to the Turner Construction Co., New York, for a fireproof, 4-story and basement, 40 x 160-foot addition to its machine shop on Gordon avenue.

PROVIDENCE, R. I.—The Emery Amusement Corporation will build a brick, steel and reinforced concrete, fireproof, 2-story and basement, 149 x 121 x 135 x 82-foot theatre and store building to cost $250,000 at Washington, Empire and Avon streets.

SCITUATE, R. I.—The Hope Co., in addition to building a brick, 1-story, 230 x 264-foot weave shed, will erect five other buildings at its plant which, with new machinery to be installed, will cost $300,000.

WOONSOCKET, R. I.—The Sidney Worsted Co. will build a brick, 2-story, 77 x 120-

Crawford Ore from the Dean-Itasca Mine on the Mesabi Range

The ore is non-bessemer, of good coarse structure. Dean-Itasca mine shipments for 1915 were 486,374 tons, mostly since August 1. For 1916 they will be considerably greater.

A complete analysis of Crawford Ore from Dean-Itasca Mine in natural state and dried at 212° Fahr.

	Dried 212°	Natural
Iron	58.35	50.2451
Phosphorus	.065	.05597
Silica	6.03	5.1924
Manganese	1.00	.8611
Alumina	3.40	2.9277
Lime	.16	.1377
Magnesia	.12	.1033
Sulphur	.031	.0266
Volatile Matter	5.74	4.9427
Moisture	13.89	

Crawford Ore Guarantee for 1916, 51.50 Per Cent Iron, Natural

The output of this mine during 1916, together with our five other mines, gives us an unusually large tonnage.

We are now taking contracts for this ore and will be glad to figure on your requirements for the coming season.

THE TOD-STAMBAUGH COMPANY

Perry-Payne Building

CLEVELAND :: :: :: :: OHIO

foot mill, a 30 x 30-foot office and a 1-story, 30 x 50-foot boiler house.

BRIDGEPORT, CONN.—The Holmes & Edwards Silver Co. has completed plans for a 4-story addition, which will be erected shortly at a cost of $50,000.

BRIDGEPORT, CONN.—The Model Tool & Gage Co. has been incorporated; $10,000 capital stock; by Michael J. Lane, Johnson Lofthouse and Archie Shield, both of Stratford.

CENTRAL VILLAGE, CONN.—The Central Worsted Co. will build a brick, 2-story, 45 x 130-foot addition to its mill.

DANBURY, CONN.—The National Utilities Corporation has been incorporated to make electrical apparatus; $200,000 capital stock; by Arthur E. Tweedy, Leopold Levy, Martin H. Griffing, John McCarthy, Martin A. Abrial, D. Frank Stevens, Charles A. Maollory, Charles D. Parks and Frank H. Lee.

HARTFORD, CONN. — The Colt's Patent Fire arms Mfg. Co. is adding three 1-story brick buildings to its plant.

HARTFORD, CONN.—The W. E. House Electric Co. has been incorporated; $50,000 capital stock; by W. E. House, H. M. Schofield, H. F. House, E. M. Young and C. B. Connor.

HARTFORD, CONN.—The Pratt & Whitney Co. has let a contract for the erection of a 4-story and basement, 60 x 108-foot tool factory addition.

HARTFORD, CONN.—The Fuller Storage Battery Co. has awarded contract for a brick fireproof, 3-story, 37 x 86-foot office and sales room building to cost $20,000 on Church street.

NEW BRITAIN, CONN. — The Stanley works is to build four additional 1-story wooden building at its plant on Burritt street.

NEW BRITAIN, CONN.—Wm. H. Cadwell, architect, is drawing plans for the Beaton & Cadwell Mfg. Co. for a 6-story and basement, 40 x 100-foot factory addition and a 1-story, 40 x 50-foot boiler house.

NEW HAVEN, CONN.—New York, New Haven & Hartford railroad has awarded a contract for abutments and piers for the new bridge across the Thames river, New London, to the Holbrook, Cabot & Rollins Corporation, Boston.

NEW HAVEN, CONN. — The William Schoolhorn Co. is to build a brick, 4-story and basement factory.

NEW HAVEN, CONN.—Fire in the Sheldon building, 103 Meadow street, did $15,000 damage, largely to the Sheldon Electrotyping Co.

PLAINVILLE, CONN.—The Rockwell-Drake Co., has had plans prepared for a 100 x 100-foot extension to its factory now under construction.

TERRYVILLE, CONN.—The Eagle Lock Co. has let a contract for the erection of a 1-story, 30 x 30-foot factory addition.

WATERBURY, CONN. — The Standard Electric Time Co. has increased its capital stock from $60,000 to $100,000.

WATERBURY, CONN. — The Connecticut Brass Co. will build a brick, 1-story, 38 x 140-foot factory building for storage and mufflers and a 38 x 40-foot office building at its West Cheshire plant.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y. — P. Tillion & Son, architects, 381 Fulton street, are taking bids on a 2-story, 80 x 100-foot factory for E. G. Stache Sons, 70 Commercial street.

BUFFALO, N. Y.—The Harrison Engineering & Contracting Co. has been incorporated; $10,000 capital stock; by Harry B. and William S. Harrison and Walter C. Newcomb, 608 D. S. Morgan building.

BUFFALO, N. Y. — The Brown-Pollard Construction Co. has been incorporated to carry on business as builder and general contractor; $6,000 capital stock; by Richard Brown, Frank R. Brown and Robert W. Pollard.

NEW YORK.—The W. S. Rockwell Co., manufacturer of heating and annealing furnaces, 50 Church street, is erecting a large new plant.

NIAGARA FALLS, N. Y.—The Niagara Searchlight Co. will build a factory addition to cost $8,000.

NIAGARA FALLS, N. Y.—The National Electrolytic Co. has let contracts for the erection of a 1-story, 20 x 60-foot addition.

NIAGARA FALLS, N. Y.—The Isco Chemical Co. is receiving bids on the construction of ten factory buildings.

ROCHESTER, N. Y.—Stephen C. Fay, 64 South Washington street, is about to let contracts for a 1-story, 50 x 90-foot shop building.

HOBOKEN, N. J.—The American Lead Pencil Co. has purchased a 75 x 109-foot site at Willow avenue and Fifth street and after razing the present structure, will erect a 10-story building.

JERSEY CITY, N. J.—The Lubricating Metal Co., 2 Rector street, New York, has bought a 93 x 175-foot plot at Van Winkel and James avenues, Marion, and will erect a plant.

JERSEY CITY, N. J.—The Provost Realty Co., a holding company for the Union Terminal Cold Storage Co., which recently purchased a 75 x 100-foot site at Twelfth and Provost streets, will improve the site by erecting a 7-story, reinforced concrete cold storage building.

JERSEY CITY, N. J.—The Seaboard By-Products Co., which was recently organized, and having offices at 15 Exchange place, and financed with a nominal capital of $2,000, has purchased from the Newark Factory Sites 38 acres on the west bank of the Hackensack river and fronting on the Delaware, Lackawanna & Western railroad. The new company, which is understood to be financed by Pittsburgh interests, will manufacture by-product coke and dyes, chemicals and other products obtained in the by-product coke process.

PERTH AMBOY, N. J.—Fire at the plant of the Barber Asphalt Paving Co. caused damage to the extent of several hundred thousand dollars. Four buildings and their contents, comprising the roofing department of the plant, were involved.

ROOSEVELT, N. J.—The U. S. Metals & Refining Co. has retained F. F. Simons, civil engineer, to survey a site for several extensive plant additions.

AMBRIDGE, PA.—The Asbestos Protected Metal Co. will erect three buildings at Fourteenth street and Belt Line railroad.

CONNELLSVILLE, PA. — The Western-Maryland railroad will build a 24-stall round house. H. P. Pratt, Baltimore, is the chief engineer.

DONORA, PA.—The chamber of commerce is interested in project to build a bridge across the Monongahela river, between Donora and Monessen. George W. Allen is secretary of the chamber.

EVENSBURG, PA.—The Cambria & Indiana railroad has awarded a contract for 12 miles of a line in Cambria county, to Lathrop & Shea, New Haven, Conn. S. H. Jenks, Evensburg, is the chief engineer.

GREENVILLE, PA. — The contract for a high service pumping station, reservoir and connecting main, has been awarded to the Chicago Bridge & Iron Works, Greenville. Chester & Fleming, Pittsburgh, are the engineers in charge.

INDIANA, PA.—The Bent Rung Ladder & Mfg. Co. has been incorporated; $50,000 capital stock; by J. E. Parnell, W. F. Wetling, Indiana; W. A. Roberts, F. J. Caldwell, Pittsburgh, F. Sutton, Washington, and J. W. Ingold, Pittsburgh.

MONACA, PA.—The Colonial Steel Co. has purchased 60 acres from the Colonial Land Co. in Moon township, for $60,000. It is reported that the Underground Steel Cable Co. of Perth Amboy, N. J., will erect a plant on the site.

NEW CASTLE, PA. — The Woods & Golden Construction Co. has been incorporated to construct bridges, sewers, etc.; $10,000 capital stock; by Frank R. Woods, Henry E. Golden and S. W. Woods.

PHILADELPHIA.—The L. H. Gilmer Co., belting manufacturer, will build a 3-story, 50 x 105-foot factory addition.

PHILADELPHIA. — The Mifflin Chemical Co. is having plans drawn by Frank E. Hahn, architect, 1112 Chestnut street, for five large factory buildings.

PITTSBURGH.—The Schenley Farms Co. plans to build an 8-story warehouse, to cost $250,000. Huntington-Davis Co., Century building, is the architect in charge.

PITTSBURGH. — The Pennsylvania Lines west of Pittsburgh plans 4-track system through Niles, O. Thomas Rodd, Pittsburgh, is chief engineer.

PITTSBURGH. — The Buffalo, Rochester & Pittsburgh railroad plans additional tracks to DuBois, Pa. E. F. Robinson, Rochester, N. Y., is chief engineer.

PITTSBURGH. — The Wonder Oil Co. of America has been incorporated to manufacture a mineral oil for automobiles and machinery; $100,000 capital stock; Joseph R. Orr is president; James C. Glow, vice president; R. E. Miles, secretary, and James D. Orr, treasurer. Offices will be established in the McGeagh building.

ROYERSFORD, PA.—J. V. Poley, architect, is drawing plans for a 2-story, 34 x 46-foot foundry addition, to be built for the Grander Stove. Co.

TYRON, PA.—The Wilson Chemical Co. is about to build a 3-story, 100 x 100-foot chemical plant to replace that recently burned.

WARREN, PA.—The county commissioners have applied to the state water supply commission for permission to build a bridge over the Allegheny river.

WILLIAMSPORT, PA. — The Friction Hinge Co. will build a 1-story, 34 x 40-foot factory building.

Activities in the Central States

AKRON, O.—The Akron Suburban railroad has been incorporated to build a line from Akron to Medina; $50,000 capital stock; by John W. Frank, Fairlong, and Albert Myers, of the Ohio Lamp Co.

AKRON, O.—The Goodyear Tire & Rubber Co. has taken out a building permit for the erection of a 5-story, 68 x 142-foot addition to its general office. The structure will cost about $48,000. The Hunkin Conkey Construction Co., 320 Cuyahoga building, Cleveland, has been awarded the general contract.

CINCINNATI.—A contract for the erection of a medical college building of the University of Cincinnati, will be let in the next few days. The structure will cost $250,000.

CINCINNATI.—The Ault & Wiborg Co. will build a new plant in St. Bernard, a suburb, and will purchase special equipment amounting to about $250,000. Plans are being prepared.

CINCINNATI.—Plans for the new plant of the R. K. LeBlond Machine Tool Co., which have just been made public, call for two buildings, one 70 x 200 feet, four stories, and the other 350 x 500 feet, one story. The cost will be $150,000 exclusive of equipment.

CINCINNATI.—The plant of the Sayers & Scoville Co., on Colerain avenue, was damaged by fire entailing a loss of $300,000. The company manufactures automobiles and carriages.

CLEVELAND.—The Canadian Scrap Iron & Metal Co. has been incorporated; $10,000 capital stock; by J. M. Ulmer, E. J. Boker, J. M. Bernstein, A. Blumenthal and E. F. Allen.

COLUMBIANA, O.—The J. Harold Tool Co. contemplates the erection of a 1-story plant of brick or hollow tile construction.

CONNEAUT, O.—A municipal electric light plant is being rebuilt in Conneaut and considerable new machinery is being installed.

CONNEAUT, O.—The Vurke Machine & Tool Co. is having plans prepared for a 1-story addition to its plant. The structure will be brick and mill construction and will cost about $4,000.

LOVELAND, O.—A new centralized school building will be erected here in the near future to cost about $250,000. Structural steel, and machine shop and foundry equipment will be needed. Plans have not been prepared.

MARION, O.—A four-acre site has been donated to the Marion Tire & Rubber Co. upon which a $20,000 building will be erected.

MEDINA, O. — The Medina Farmers' Exchange Co. will begin work immediately on an elevator and warehouse, 40 x 120 feet, three stories and basement, to be erected at a cost of $18,000. Preliminary contracts have been let to the Clement Co.

MENTOR, O.—The Kinney Steel Ship Co. has been incorporated; $600,000 capital stock; by A. T. Kinney, William G. Shapry, Frederick L. Lockie, Frank Masten and Tracy H. Duncan.

MT. VERNON, O.—The Ohio Fuel Supply Co. is preparing to spend about $75,000 on a plant at the Homer station for the extraction of benzol and other by-products from gas.

NEW CUMBERLAND, O.—Plans are being prepared for the remodeling of the Chelsea Pottery works across the river from Calumet in order that metal cans, coal buckets and similar sheet metal products may be turned out.

NEW STRAITSVILLE, O.—The Baltimore & Ohio railroad is reported to have plans for a line to connect several industries located in the immediate section about New Straitsville.

NILES, O.—The Niles Forging & Mfg. Co. is building a machine shop 25 x 100 feet.

SPRINGFIELD, O.—The Miller Gas Engine Co. will build an addition to its plant in the near future.

UPPER SANDUSKY, O. — The Nevada Elevator & Supply Co. has been incorporated; $15,000 capital stock; by C. R. Cross and others.

WARREN, O.—The Warren Tool & Forging Co. is building an extension to its plant at Warren, O.

WOOSTER, O.—C. V. Hard, president of the Wooster Electric Co., announces that the capacity of the plant will be increased by the addition of a turbine engine and considerable other equipment.

WOOSTER, O. — The Buckeye Aluminum Co. has announced that it will spend about $50,000 on improvements to increase its capacity. F. H. Blake is treasurer of the company.

WOOSTER, O.—The Medal Brick Co., successors to the Wooster Shale Brick Co., has announced that its plant will be rebuilt and that the capacity will be doubled by the addition of nine kilns.

LOGAN, W. VA. — S. B. Robertson will erect a 6-story warehouse, 60 x 104 feet, of steel construction.

AKRON, IND.—The town board is considering plans and cost of constructing water works plant.

BRAZIL, IND.—The Wood Turret Machine Co., David Wood, manager, will build a 1-story addition, 80 x 250 feet. Bids will be taken in the spring by Johnson & Miller, architects, 105 South Seventh street, Terre Haute, Ind.

CHICAGO.—The Stockyards Scrap Iron & Metal Co. has been incorporated; $20,000 capital stock; by Charles J. Martin, Daniel O'Connell, Edward W. Weiss.

KEWANEE, ILL.—A complete new waterworks system is to be built, $75,000 in bonds having been voted. Bids will be taken soon by the water commissioners.

PEORIA, ILL. — The O'Connell Sheet Metal Co. has been incorporated; $2,000 capital stock; by Philip O'Connell, A. S. Hagerty. The office of the company is located at 923 Forsyth street.

ROCKFORD, ILL.—Bids will be received until April 10 by H. J. Gallagher, for a reinforced concrete bridge across Rock river at Chestnut street, costing $90,000. Edwin Main is city engineer.

BLISSFIELD, MICH.—The A. H. Smith Co., engineer, Toledo, is preparing plans for a waterworks system to cost $56,000.

DETROIT.—The Bour-Davis Motor Car Co. will build a factory, 60 x 300 feet, two stories. W. Brown, Arcade building, Detroit, is the secretary.

APPLETON, WIS.—Woodmansee & Davidson, consulting engineers, Chicago, have awarded the general contract for building a fireproof powerhouse for the hydro-electric plant of the Wisconsin Traction, Light, Heat & Power Co. of Appleton to the Worden-Allen Co., Milwaukee.

ASHLAND, WIS.—The Soo Line has issued orders from Minneapolis that contractors for materials and labor on the new $1,000,000 ore dock at Ashland be directed to prepare for work immediately in order that operations may proceed as soon as possible. The new dock will have 140 pockets and a capacity in excess of 50,000 tons. It will be of concrete

Norfolk & Southern Issues Big Tool List

To keep pace with the tremendous flood of traffic, railroads all over the country must spend money freely on new rolling stock and equipment. The Norfolk & Southern railroad, Norfolk, Virginia, is erecting extensive shops and is in the market for the following list:

One double axle lathe;
One back-geared engine lathe;
One crank shaper;
One crank planer;
One universal milling machine;
One cutter and reamer grinder;
One dry tool grinder;
One link grinder;
One portable valve facing machine;
One hydraulic wheel press;
One pit jack;
One combination turret or turntable lathe;
One bending roll;
One flanging clamp;
One flange punch;
One double punch and shear;
One flue cleaning machine;
One 25-pound belt-driven hammer;
One forging machine or bulldozer;
One superheater tube welding machine;
One case hardening and spring furnace;
Two forging furnaces;
One flue welding furnace;
Two air compressors, 600 and 875 cubic feet capacity;
One 2-ton traveling electric hoist
and one portable bushing press.

and steel and one of the most modern docks on the Great Lakes.

DE PERE, WIS.—The C. A. Lawton Co., DePere, has taken the contract for installing motors and machinery for the Main street drawbridge.

GREEN BAY, WIS.—The city of Green Bay will build a bascule bridge, 825 feet long, with 90-foot bascule leaf. Felix Biemert is the public commissioner.

JANESVILLE, WIS.—The Bower City Machine Co., recently organized by William C. St. Clair and W. C. Gruetzmacher, has awarded contracts for the erection of a machine shop. C. D. Manley has become interested. The company will do general machine work, and engineering development, specializing in gas engine and tractor practice. The new shop is 60 x 61 feet, two stories, and will be ready April 15.

KENOSHA, WIS.—The Peter Pirsch Co., manufacturing fire apparatus, chemical extinguishers, etc., has purchased additional acreage and will erect new buildings to double the capacity. Peter Pirsch is president.

KENOSHA, WIS.—The Frank L. Wells Co., operating a foundry and machine shop at South and Exchange streets, will build a new shop, 45 x 90 feet, two stories, with an electric freight elevator. The general contract is in charge of the Kenwood Bridge Co., 1416 First National Bank building, Chicago.

MILWAUKEE.—The J. B. D. Resilient Wheel Mfg. Co., Milwaukee, has increased its capital stock from $30,000 to $50,000. The concern manufactures a ball-bearing, steel wheel for automobiles and trucks and will largely increase its capacity.

MILWAUKEE.—George F. Staal, city engineer, is preparing plans for a double bascule bridge 270 feet long, 90 feet clearance, 45-foot roadway at State and Martin streets, to cost $155,000. A bascule bridge is projected for Cedar and Biddle streets, to cost $150,000.

MILWAUKEE, WIS.—Articles of incorporation have been filed by the Crown Brush Co. to manufacture steel wire brushes for factory, shop and general purposes. The capital stock is $20,000 and the incorporators are Hans DeTroy, Frank Meller and B. H. Osborn.

MILWAUKEE.—The Electric Steel Castings Co., organized by Leo G. Smith and now erecting a steel foundry at Sixty-fourth avenue and the Belt line, in West Allis, has purchased a 6-ton Heroult furnace. The foundry will produce electric steel castings exclusively and will begin operations early in May, depending upon the completion of the foundry and delivery of equipment. The company is capitalized at $300,000.

MILWAUKEE.—According to a statement by William W. Coleman, president of the Bucyrus company, South Milwaukee, no munitions are being made nor is provision being made for such manufacture at the South Milwaukee plant. This statement refutes a report that the Mississippi Valley Metal Products Co., St. Louis, has taken an order for 150,000 high explosive 8-inch howitzer shells and that part of the order would be produced at South Milwaukee.

MILWAUKEE.—The O'Brien & Jackson Construction Co., Chicago, is the lowest bidder at $480,000 for the construction of a 2,500-foot extension to the Linwood avenue waterworks intake, the removal of the present crib and the construction and setting of a new steel crib. That part of the contract referring to the steel crib work amounts to $131,000 in the O'Brien & Jackson bid. The date of the award of contract is still indefinite. Fred G. Simmons is commissioner of public works.

RACINE, WIS.—The Wisconsin Smelting Co. has filed articles of incorporation. The capital stock is $5,000 and the incorporators are Frank Weisman, Rachel Weisman and Edward Davison. A metal refining plant will be operated.

SHEBOYGAN, WIS.—The Myers Machine Co., Sheboygan, which recently established a motor truck manufacturing department, and subsequently absorbed the Wisconsin Motor Truck Co., Baraboo, Wis., is now marketing its product. A factory addition built to accommodate the motor truck department is practically completed. George P. Myers is general manager.

TWO RIVERS, WIS.—A plant for the manufacture of general farm equipment is about to be established by the Farmers' Equipment Co., Two Rivers, organized by Louis Sell and William Plantiko. Factory quarters have been leased and are now being equipped. Mr. Plantiko formerly was associated with the Badger Specialty Co.

WASHBURN, WIS.—According to a report by F. T. Beers, superintendent of works of the DuPont Powder Co., Barksdale, Wis., an additional appropriation of $250,000 is available for new buildings and equipment to supplement the extensive improvements that have been under way for more than a year. The Barksdale plant is employing between 850 and 900 operatives.

WEST BEND, WIS.—Two new buildings will be erected this year by the West Bend Woolen Mills, John Geib, manager. A 60-x 106-foot addition will be made to the blanket mill. A new powerhouse will also be erected and will contain a dye house and picking room. This structure will be 50 x 70 feet, two stories.

ELKRIDGE, MO.—Davis & Hamphill will build a brick and steel plant and install automatic screw machines.

KANSAS CITY, MO.—The Western Type Machinery Co. has been incorporated to build printing presses; $24,000 capital stock; by A. G. Blauner, G. R. Tuttle and L. D. Hauserman.

POPLAR BLUFF, MO.—A contract will be let in June for a bridge over Black river, having a 150-foot span. E. C. Nickey is the highway engineer.

ST. LOUIS, MO.—Frank L. Schaab Stove Co. has been incorporated; $12,000 capital stock; by Frank L. Schaab, Benjamin F. Becker and Frank Becker.

ST. LOUIS, MO.—J. D. Davis, 506 Olive street, will build a 15-story hotel, 130 x 150 feet. Mauran, Russell & Crowell, architects, Chemical building, are preparing the plans.

ST. LOUIS, MO.—The Mississippi Valley Metal Products Co. has been awarded a contract by the British government for high-explosive shells. It has been estimated that the order involves about $5,000,000. A portion of the contract will be sub-let.

DAVENPORT, IA.—The Tri-City Railway Co. of Iowa, will build a machine and repair shop at Rock Island at a cost of $80,000. J. G. Huntoon, Davenport, is the vice president and general manager of the road.

FAIRFIELD, IA.—The Louden Machinery Co. will build a 2-story factory.

MARSHALLTOWN, IA.—The Central Foundry has been awarded a contract by the Ford Motor Co., Detroit, for castings. A new concern is being organized to care for a part of this business and will be known as the American Machine Products, which will be incorporated at an early date. O. H. Watkins and R. A. Watkins, Kenosha, are interested in the new concern.

In the South and Around the Gulf

BURLINGTON, N. C.—The Southern Structural Steel Co. has been incorporated and will construct a 24 x 150-foot shop; the company will equip this plant in order to have a daily capacity of about 20 tons of structural material.

GADSDEN, ALA.—The Gadsden Car Works will build a concrete wall and steel tank and remodel its plant, which, with the addition of considerable equipment, will represent an expenditure of about $22,000.

CLOVERPORT, KY.—Fire damaged the roundhouse, machine shops and car repair shops of the Louisville, Henderson & St. Louis railroad The loss is estimated at about $150,000.

COVINGTON, KY.—The Insurance Foundry Co. has been incorporated to carry on business as a general founder; $10,000 capital stock; by Herman H. Uckotter, George B. Uckotter and Robert H. Uckotter.

OWENSBORO, KY.—The International Implement Co. has been incorporated; $121,000 capital stock; by J. R. Pile, Edward W. Smith, M. F. Bransford and Floyd J. Laswell.

BATSON, TEX.—Thompson & Beitrick will rebuild the machine shop and electric light plant recently damaged by fire. The estimated cost of reconstruction is $50,000.

FORT WORTH, TEX.—The Fort Worth Boiler Works will rebuild its plant recently damaged by fire. William Richmond is the plant manager.

GILMER, TEX.—The Texas Public Service Co. will install a 75-kilowatt-volt-ampere, 3-phase, 60-cycle, 2,300-volt generator, direct-connected to a steam engine. Nefille Levy is the manager.

HOUSTON, TEX.—The attorney general has approved bond issues of $36,000 for waterworks and $30,000 for bridges.

TEXARKANA, TEX.—The City of Texarkana will spend $30,000 for waterworks improvements.

CLEVELAND, OKLA.—The proposed waterworks system is to include a 100,000-gallon steel tank on a 100-foot tower and four turbine pumps with motors. Daniel Heller is the city clerk.

CUYLER, OKLA.—The city of Cuyler plans to construct an electric light plant and waterworks system. Address the mayor.

DEWAR, OKLA.—Bonds for $40,000 have been voted for waterworks construction. J. W. Fowler is president of the board.

GOTEBO, OKLA.—The Gotebo Light & Power Co. will install a 25 to 50-kilowatt direct current, 220-volt generator, 325 revolutions per minute and a 15 to 20-kilowatt 225-volt generator, 280 revolutions per minute, direct-connected to oil engines.

FORT COBB, OKLA.—Plans are being prepared for a waterworks system to be constructed by the city.

RINGLING, OKLA.—Bonds for $50,000 have been voted for waterworks construction. A contract will be let in April. F. F. Kilch is president of the board of trustees.

New Trade Publications

FOUNDRY EQUIPMENT.—A 24-page catalog issued by the Illinois Mfg. & Supply Co., Quincy, Ill., is devoted to exhaust tumbling mills, steel plate dust arresters, water cinder mills, exhaust fans and sand mixers. Many illustrations are presented and the text is devoted to an explanation of the savings possible with this equipment.

THEATRICAL DEVICES. — The Sprague Electric Works, of the General Electric Co., New York, has issued a 24-page bulletin descriptive of its stage lighting devices. These include spot lights, strip, proscenium and foot lights, dimmers, exit lights, etc. A wide variety of wall and floor plugs, switch boards, fans and ozonators is also described and illustrated.

MOTOR TRUCKS. — A 24-page bulletin published by the Reo Motor Truck Co., Lansing, Mich., describes the construction of the company's motor trucks and the numerous uses to which they may be adapted. The bulletin contains an interesting treatise on the advantages of motor trucks over other means of transportation, with many illustrations showing trucks in actual service. It is claimed that Reo commercial vehicles are in use in more than 100 lines of business.

UNDERFEED STOKERS.—The Underfeed Stoker Co. of America, Chicago, has issued a 32-page general catalog setting forth the construction and application of the Jones underfeed mechanical stoker. Details of the various parts are shown together with diagrams illustrating the installation under varying conditions of boiler construction. Only general information is given, with a hint as to special uses to which the stoker has been adapted. Devices for supplying forced draft and regulating fuel and air are also given attention.

BRONZE CASTINGS.—The Titanium Alloy Mfg. Co., Niagara Falls, N. Y., has issued a 48-page booklet containing chemical analyses and data covering the physical properties of a large number of standard bronze compositions, including both plain and titanium-aluminum alloys. Microphotographs are presented showing the molecular arrangement of each alloy. The booklet also contains a description of standard methods of testing bronze alloys, together with data on the electrical properties and physical contents of the more common metallic elements.

PNEUMATIC APPLIANCES.—The Curtis Pneumatic Machinery Co., St. Louis, has published an 84-page catalog descriptive of its products, which include air compressors, air hoists, trolleys and trolley systems, sand blasts, pneumatic and hydro-pneumatic elevators, jib and traveling cranes. Especially interesting are the descriptions of the company's air hoists, which are illustrated in service in numerous capacities. The combination of the hydraulic and pneumatic principles is graphically described. The book contains a large number of illustrations.

McLAIN'S SYSTEM. — A 48-page catalog issued by McLain's System, Goldsmith building, Milwaukee, is devoted to the course in semi-steel manufacture offered by this school. Probably never before in the foundry industry has as much interest been manifested in semi-steel as at the present time and the large number of illustrations included in this catalog of semi-steel castings of difficult and infinite design reflects the utility of this metal. Many testimonial letters also are reproduced from students who have benefitted from the course not only in semi-steel manufacture, but other courses offered by this school.

FLUE TOOLS. — A 95-page catalog has been issued by Gustav Wiedeke & Co., Dayton, O., showing a complete line of tools for boiler tubes. The various devices described include tube expanders for standard and arch tubes adapted to either hand or power use, beading tools, superheater tube expanders, pneumatic hammers, ratchet wrenches, water tube boiler expanders and tube cutters. In addition to the information devoted to the products manufactured by the company, there are a number of charts showing various types of American locomotives and small cuts of English and continental passenger locomotives. Practical suggestions are given for setting and tightening copper ferrules and tubes as adopted by many American railroads.

OXYGEN AND HYDROGEN GENERATORS.—A 24-page catalog issued by the International Oxygen Co., New York City, describes this company's bipolar gas generators, which are manufactured in units of various sizes and consist of a series of metallic plate electrodes clamped together and electrically insulated from one another. They are separated by diaphragms of porous fabric. Each pair of electrodes forms a closed cell, which is filled with electrolyte. The current of electricity passing through the device releases oxygen and hydrogen from the contained water. Advantages claimed for these generators include impossibility of leakage or distortion and simplicity of erection and operation. The book contains interesting portraits of the company's generators in actual service.

STEEL LETTERING DIES AND STAMPS.—The Jas. H. Matthews & Co., Pittsburgh, manufacturers of steel lettering dies and stamps, have published a 32-page catalog which is unique, not only in general attractiveness, but in fact that it is claimed to be the first and only one of its kind ever issued. The Matthews company, which has been in business 56 years, occupies what is said to be one of the largest and most modernly equipped factories in the United States devoted exclusively to the manufacture of marking devices and metal stamps.

A feature of the catalog is the interesting manner in which photographs of various phases of the steel industry and vignettes showing methods of using Matthews stamps and dies in marking steel products, are interspersed with reproductions of the tools described. The history of the firm's development, with illustrations showing its growth from a small storeroom to the present handsome quarters, is likewise included. Among the products described are hand made beveled steel letters and figures, trade-mark and symbol steel stamps, fullered forging steel hand stamps, eye forging steel stamps, changeable steel type and holders, steel roller stamps, steel stamping dies, tin plate dies, steel billet marking stamps and inspection marking hammers. Steel log stamps, stencil and embossing dies, tin tag addressing machines, interchangeable embossing type and semi-automatic tag marking machines are also described.

GRAB BUCKETS AND DUMP CARS.—In a handsome 166-page catalog recently issued, the Lakewood Engineering Co., Cleveland, describes a wide variety of devices of its manufacture used in concrete construction, and also, of special interest to the iron and steel trade, its line of clam shell buckets and dump cars. A brief treatise sets forth the merits of the Lakewood company's buckets in a graphic manner, describing the construction and operation of the shell, corner arm brackets, teeth, hinges, counterweights and sheaves. Many diagrams, vignettes and photographs accompany the text. Numerous installations in actual service are also portrayed. A chapter is also devoted to miscellaneous types of buckets for handling concrete, coal, sand, ashes, stone, rocks, etc. A chapter on dump cars illustrates and describes nine types adapted to more than as many uses and including three-way dump cars, scoop and hopper cars, etc. As is usual with the Lakewood company's publications, the catalog is artistically gotten up, with marginal and initial illustrations.

CHAIN HOISTS—A 95-page catalog has been issued by the Chisholm-Moore Mfg. Co., Cleveland, describing chain hoists, hand power traveling cranes, ammunition hoists, and malleable iron castings. Chain hoists are made in sizes ranging from ¼ to 40 tons capacity. Above the 3-ton size the design of these hoists is unique in that it is claimed to be the only one used by hoist manufacturers providing for a single unit of lifting mechanism. The head of the 40-ton hoist is divided into three sections by two partitions, the two outer sections each containing a load chain wheel, and the central section a pinion and three spur gears. This pinion is mounted on the hand wheel shaft. The two load chain wheels are each mounted on a hollow steel shaft, and the hand wheel shaft passes through these hollow shafts, carrying the pinion in the central division which drives the three spur wheels mounted on shafts with eccentric shaped ends. The three eccentrics carry in each of the outer divisions, spur wheel having 48 teeth, which mesh into an internal gear on the load chain having 50 teeth, so that each revolution of the eccentric gives a gyratory movement to the spur wheel, each revolution of the eccentric moving the chain load wheel forward two teeth. The hoist has a multiple disc brake, and the load is carried on eight strands of ¾-inch chain. Ninety pounds pull on each of the hand chain wheels raises 40 tons on the load chain.

The catalog also mentions power winches for electric motors, shock absorbers for hoists subjected to heavy jars, and hand power traveling cranes of single and double I-beam construction. Overhead trolleys, two and three-way switches, and malleable frogs are described. A large part of the booklet is devoted to apparatus for handling ammunition and guns. Among the various devices described are telescoping shell tongs and shell clamps, trolley hoists for 8, 12 and 14-inch shells, and hoists for handling 3, 4, 5 and 6-inch guns. The tongs by which shells are handled are opened or closed by a single movement and have a lock to prevent lateral movement of the shell. They require but ¾-inch space between the shells as they lie in the magazine. Door hangers and locks for baggage cars and elevators are described. On the last page the outcome of experiments carried on by the company to produce a special malleable iron is announced and the facilities at the plant for making malleable, gray iron, brass and aluminum castings are mentioned.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Lower price to July 1; higher to Jan. 1.)

Bessemer valley	$21.00
Bessemer, Pittsburgh	21.95
Basic, Pittsburgh	19.45
Basic, eastern Pa.	19.75 to 20.25
Basic, Buffalo	19.00 to 20.00
Malleable, Pittsburgh	19.45 to 19.95
Malleable foundry, Chicago	19.50
Malleable foundry, Philadelphia	21.50 to 21.75
Malleable foundry, Buffalo	18.50 to 19.00
No. 1X foundry, Philadelphia	20.50 to 20.75
No. 2 foundry, Pittsburgh	19.45 to 19.95
No. 2 foundry, Cleveland	19.00
No. 2 foundry, Ironton	18.50 to 19.00
No. 2 foundry, Chicago	19.00
No. 2X foundry, Philadelphia	20.00 to 20.50
No. 2X foundry, N. J. tidewater	20.00 to 20.50
No. 2X foundry, Buffalo	18.50 to 19.00
No. 2 plain, Philadelphia	19.50 to 20.00
No. 2 plain, N. J. tidewater	19.50 to 20.00
No. 2 plain, Buffalo	18.00 to 18.50
No. 2 southern, Birmingham	15.00 to 15.50
No. 2 southern, Cincinnati	17.90 to 18.40
No. 2 southern, Chicago	19.50 to 20.00
No. 2 southern, Phila. delivery	20.00 to 20.50
No. 2 southern, Cleveland	19.00 to 19.50
No. 2 southern, New York docks	19.00 to 19.50
No. 2 southern, Boston docks	19.25 to 19.75
No. 2 south. interior, New Eng.	20.00 to 21.00
No. 2 southern, St. Louis	18.40 to 18.90
Virginia No. 2X furnace	18.50
Virginia 2X, Philadelphia	21.25
Virginia 2X, Jersey City	21.00
Virginia 2X, Boston points	21.75
Gray forge, eastern Pa.	18.50 to 19.00
Gray forge, Pittsburgh	18.95
Gray forge, Birmingham	14.00 to 15.00
Silveries, 8 per cent, furnace	26.00 to 27.00
Silveries, 8 per cent, Chicago	29.50
Low phos. Standard, Phila.	32.00
Low phos. Lebanon, Pa.	28.00 to 32.00
Low phos. Pittsburgh	30.00 to 31.00
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	19.75 to 22.25
Charcoal, Buffalo	19.00 to 20.00
Charcoal, Birmingham	21.50

IRON ORE

Lake Superior Ores.
(Lower Lake Ports.)

Old range Bessemer, 55 per cent, ton	$4.45
Mesabi Bessemer, 55 per cent, ton	4.20
Old range non-Bes., 51½ per cent, ton	3.70
Mesabi non-Bess., 51½ per cent, ton	3.55

Eastern Ores.
(Per unit delivered eastern Pennsylvania.)

Pt. Henry fur., 60 per cent, unit.	8.6c to 8.9c
Local N. Y. and N. J. ores, unit.	8.5c to 8.75c
Port Henry lump, at mines, ton..	$4.00

Foreign Ores.
(Per unit Philadelphia.)
(Prices nominal.)

Foreign Bess., 50 to 65 per cent	8 to 8½
For'n non-Bess., 50 to 65 per cent	8 to 8½

COKE

(At the ovens.)

Connellsville furnace	$3.50 to 3.75
Connellsville fur., contract	3.00
Connellsville foundry	3.50 to 3.75
Connellsville fdy. contract	4.00
Wise county furnace, contract	2.85 to 3.25
Wise county foundry, contract	3.50 to 3.75
Pocahontas foundry, contract	3.25 to 3.75
Pocahontas furnace, contract	2.85 to 3.25
New River, foundry contract	3.75 to 4.25
New River, furnace contract	3.25 to 3.50

FERRO ALLOYS AND STEEL MAKING METALS

Ferro manganese, 80 per cent, seaboard, prompt	$350 to 400
Ferro manganese, 80 per cent, seaboard, contract	175
Spiegel, 20 per cent, furnace, prompt and 2nd quarter	70.00 to 100.00
Spiegel, 20 per c't, fur, last half	60.00
Ferro-silicon, 50 per cent, Phila.	83.00 to 85.00
Ferro silicon, 50 per cent, Pbgh.	83.00 to 85.00

Bessemer ferro-silicon, 9 per cent to 10 per cent, $30.00; 10 to 11 per cent, $31.00; 11 to 12 per cent, $32.00; 12 to 13 per cent, $33.00 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-chrome, nominal.

Ferro-vanadium, nominal, Pittsburgh.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

Nickel, nominal.

Ferro-tungsten, nominal.

Cobalt metal, nominal, Pittsburgh.
Aluminum, nominal, Pittsburgh.
Ferry-molybdenum, Pittsburgh, nominal.

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive for insurance and dockage.

From New York	$0.40
From Pittsburgh	.619
From Youngstown	.619
From Niles	.619
From Wheeling	.619
From Steubenville	.619
From Johnstown	.604
From Coatesville	.545
From Steelton	.555
From Bethlehem	.529
From Cleveland	.65
From Chicago	.765

SEMI-FINISHED MATERIAL

Open hearth billets, Phila.	$45.00 to 50.00
Forging billets, Phila.	55.00 to 65.00
Forging billets, Pbgh., nominal.	55.00 to 65.00
Forging billets, Chgo.	55.00 to 60.00
Wire rods, Pittsburgh (nom.)	50.00 to 60.00
Bessemer billets, Youngstown	40.00 to 42.00
Bessemer billets, Pittsburgh	40.00 to 42.00
Open hearth billets, Pittsburgh.	40.00 to 42.00
Open hearth billets, Youngstown	40.00 to 42.00
Bess. sheet bars, Youngstown	40.00 to 42.00
Op. h'th sheet bars, Youngstown	40.00 to 42.00
Bess. sheet bars, Pittsburgh	40.00 to 42.00
Open h'th sh. bars, Pbgh.	40.00 to 42.00
Muck bar, Pittsburgh (nominal).	40.00

SKELP

Grooved steel skelp	2.25c to 2.35c
Sheared steel skelp	2.35c to 2.45c

RAILS AND TRACK MATERIAL

Stand. Bess. rails, Pbgh. & Chg.	1.25c
Stan. op-h'th rails, Pbgh. & Chg.	1.34c
Light rails, 8 to 10 lbs., Pbgh.	1.85c
Light rails, 8 lb., Chgo.	1.76c
Light rails, 12 to 14 lbs., Pbgh.	1.80c
Light rails, 12 lbs., Chgo.	1.71c

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—

Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18

Buffalo to:—

Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Broklyn (by canal)	1.25 to 1.60

Virginia furnaces to:—

Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88

Birmingham, Ala., to:—

Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (r. and w.)	4.25
Philadelphia (all rail)	5.20
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75

Chicago to:—

Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:—

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

Light rails 16 to 20 lbs., Pbgh.	1.75c
Light rails 16 to 20 lbs., Chgo.	1.66c
Light rails 25 to 45 lbs., Pbgh.	1.70c
Light rails 25 to 45 lbs., Chgo.	1.61c
Relaying rails, standard, Pbgh. and Chgo.	$23.00 to 24.00
Relaying rails, light, Chgo.	21.50 to 22.50
Angle bars, st. sect., Pbgh., base	1.50c to 1.75c
Angel bars, st. sections, Chgo.	1.50c to 1.75c
Spikes, railroad, Pbgh.	2.50c to 2.65c
Spikes, railroad, Chgo.	2.60c to 2.75c
Track bolts, Pbgh.	3.25c
Track bolts, Chgo.	3.25c to 3.50c
Tie plates, Chgo.	45.00 to 48.00

SHAPES, PLATES AND BARS

Structural shapes, Pbgh.	2.50c
Structural shapes, Pbgh. (con.)	2.35c to 2.50c
Structural shapes, Chgo.	2.54c to 3.04c
Structural shapes, Philadelphia	2.659c to 3.159c
Structural shapes, New York	2.669c to 3.169c
Struc. shapes, San Francisco	2.00c to 2.05c
Tank plates, Chgo.	2.79c to 3.19c
Tank plates, Pbgh. (con.)	2.60c to 2.75c
Tank plates, Pbgh.	2.75c to 3.25c
Tank plates, Philadelphia	2.909c to 3.659c
Tank plates, New York	2.919c to 3.669c
Bars, soft steel, Chgo.	2.54c to 3.04c
Bars, soft steel, Pbgh. (con.)	2.35c to 2.50c
Bars, soft steel, Pbgh.	2.50c
Bars, soft steel, New York	2.519c to 3.169c
Bars, soft steel, Phila.	2.509c to 3.159c
Hoops, carloads, Pbgh.	2.50c to 2.75c
Bands, Pittsburgh	2.35c
Shafting, Pbgh., contr. carloads	25 off
Bar iron, Chgo.	2.25c
Bar iron, Philadelphia	2.559c
Bar iron, New York	2.569c
Bar iron, Cleveland	2.25c
Bar iron, Pittsburgh	2.40c to 2.50c
Hard steel bars, Chgo.	2.25c to 2.35c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	2.75c to 2.85c
No. 28, black, Chgo.	3.09c to 3.19c
No. 28, tin mill, black, Pbgh.	2.70c to 2.80c
No. 28, galvanized, Pbgh.	4.85c to 5.10c
No. 28, galvanized, Chgo.	5.19c
No. 10, blue anl'd, Pbgh.	2.90c to 3.00c
No. 10, blue anl'd, Phila.	3.059c to 3.559c
No. 10, blue anl'd, Chgo.	3.19c to 3.29c
Tin plate, 100 lb., coke base	$4.25 to 4.50

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickl'd, cold roll. and re-anld.	30 cents
Hot roll'd pickled and anl., tin mill.	25 cents
Full pickled, cold rolled and re-anld.	50 cents
Auto sheets	75 cents
Blue stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller leveling	10 cents
Patent leveling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxiding	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free fr. mill scale	55 cents
Special open hearth deep stpg. steel, free from mill scale	80 cents
Extra deep special auto body stock.	1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black. Butt-weld.	Galv. Butt-weld.
Steel, ⅜ to 3 inches	73	55½
Iron, ⅜ to 1½ inches	63	43
	Lap-weld.	
Steel, 2½ to 6 inches	70	61

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	61
Iron, 3½ to 4½ inches, l. c. l.	49

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotations.)

Wire nails, jobbers', Pittsburgh	$2.40
Plain wire, jobbers', Pittsburgh	2.25
Galvanized wire, jobbers', Pbgh.	2.95
Polished staples, Pbgh.	2.55
Galvanized staples, Pbgh.	3.25
Barb wire, painted, jobbers', Pbgh.	2.55
Barb wire, galv., jobbers', Pbgh.	3.25

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled thread, 60 and 10, cut threads 60 and 5; larger or longer, 50.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller or shorter, rolled 60, 10 and 5; cut, 60 and 10; larger or longer, 50 and 10.

Cold pressed, semi-finished hexagon nuts, 75 and 10.

Gimlet and cone point lag bolts, 65. Hot pressed square, blank or tapped nuts, $3.25 off list; hot pressed hexagon blank or tapped, $3.25.

Cold pressed square, blank or tapped, $3.50 off; hexagon, blank or tapped, all sizes, $4.25.

RIVETS

Structural rivets, Pbgh	3.15c
Structural rivets, Chgo. delivery	3.30c
Boiler rivets, Pbgh	3.25c
Boiler rivets, Chgo. delivery	3.40c

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	2.35c

STANDARD STEEL CHAIN

Chain, ⅜ inch proof coil	5.00c

COLD ROLLED STRIP STEEL

Base price $5.50 to $6.00 per 100 pounds, hard, coils 1½ inches and wider and by .100 inches and heavier.

Extras.

.10 to .19 carbon. 1½ inches and wider.

	Coils. Hard.	Soft.
0.100 and heavier	Base	$0.25
0.050 to 0.099	$0.05	0.30
0.035 to 0.049	0.20	0.45
0.031 to 0.034	0.35	0.75
0.025 to 0.030	0.45	0.85
0.020 to 0.024	0.55	0.95
0.017 to 0.019	1.35	1.35
0.015 to 0.016	1.75	1.75
0.013 to 0.014	2.45	2.45
0.012	2.80	2.80
0.011	3.15	3.15
0.010	3.50	3.50
Lengths 24 Inches and Over.	Hard.	Soft.
0.100 and heavier	$0.10	$0.35
0.050 to 0.099	0.20	0.45
0.035 to 0.049	0.35	0.60
0.031 to 0.034	0.60	1.00
0.025 to 0.030	0.85	1.25
0.020 to 0.024	1.05	1.45
0.017 to 0.019	2.45	2.45
0.015 to 0.016	2.85	2.85
0.013 to 0.014	3.70	3.70
0.012	4.30	4.30
0.011	4.65	4.65
0.010	5.00	5.00

Extras as per card of Jan. 1, 1916.

CAST IRON WATER PIPE

Four-inch, Chicago	$32.50 to 33.00
Six-inch and larger, Chicago	29.50 to 30.00
Six-inch Class B, New York	29.50
Four-inch, Class B, New York	32.50
Four to six-inch, Birmingham	28.00
Six-inch and larger, Birmingham	25.00

Light weight water and gas pipe, $1 per ton higher than standard water.

WAREHOUSE PRICES

Steel bars, Chicago	3.10c
Steel squares, 2-in. & ov., Cleve.	3.75c
Steel rounds, 2-in. & ov., Cleve.	3.75c
Steel bars, under 2 in., Cleveland	3.25c
Steel bars, Philadelphia	2.85c
Steel bars, New York	2.95c
Steel bars, St. Louis	3.15c
Steel bars, Cincinnati	3.20c to 3.75c
Steel bars, St. Paul	3.20c
Steel bars, over 2-inch, Buffalo	3.65c
Steel bars, Buffalo	2.95c
Iron bars, Chicago	2.30c
Iron bars, Cleveland	3.20c
Iron bars, St. Louis	2.75c
Iron bars, Cincinnati	3.20c to 3.75c
Iron bars, Philadelphia	2.85c to 3.00c
Iron bars, New York	2.95c
Shapes, Chgo.	3.10c
Shapes, St. Louis	3.15c
Shapes, St. Paul	3.20c
Shapes, New York	2.95c
Shapes, Cleveland	3.25c
Shapes, Philadelphia	2.85c
Shapes, Buffalo	2.95c
Shapes and plates, Cincinnati	3.20c to 3.50c
Plates, Chgo.	3.50c
Plates, St. Louis	3.55c
Plates, St. Paul	3.60c
Plates, New York	3.50c
Plates, Cleveland	3.65c
Plates, Philadelphia	3.50c
No. 10 blue anl. sheets, Chgo.	3.25c
No. 10 blue anl. sheets, Clevel'd	3.50c
No. 10 blue anl. sheets, Buffalo	3.25c
No. 10 blue anl. sheets, St. Louis	3.30c
No. 10 blue anl. sheets, Cinci.	3.35c
No. 10 blue anl. sheets, St. Paul	3.35c
No. 28 black sheets, Chgo.	3.20c
No. 28 black sheets, Cleveland	2.95c
No. 28 black sheets, Cincinnati	3.80c
No. 28 black sheets, St. Louis	3.20c
No. 28 black sheets, St. Paul	3.35c
No. 28 galv. sheets, Chgo.	4.80c to 5.00c
No. 28 galv. sheets, Cleveland	5.25c
No. 28 galv. sheets, Cincinnati	5.50c
No. 28 galvanized sheets, St. L.	5.25c to 5.50c

Freight Rates, Coke

Connellsville district, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.85
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

Arch bars and transoms, Chgo.	$18.00 to 18.50
Angle bars, iron, Chicago	17.25 to 17.75
Angle bars, steel, St. Louis	14.00 to 14.50
Arch bars and transoms, Chgo.	19.00 to 19.50
Arch bars and transoms, St. L.	18.50 to 19.00
Cut forge, Chicago	15.00 to 15.25
Knuckles, coup., Chgo	16.00 to 16.25
Springs, St. Louis	15.50 to 16.00
Springs, Chgo.	16.25 to 16.50
Knuckles, coup., St. L.	15.50 to 16.00
Locomotive tires, Chicago	17.00 to 17.50
Locomotive tires, St. Louis	17.00 to 17.50
Railroad wrought, No. 1, Chgo.	16.25 to 16.75
Railroad wrought, No. 1, Cleve.	18.00 to 18.50
Railroad wrought, No. 1, St. L.	15.50 to 16.00
Railroad wrought, No. 1, Cinci.	13.00 to 13.50
Railroad wrought, No. 2, Chgo.	15.00 to 15.25
Railroad wrought, No. 2, St. L.	15.00 to 15.50
Shafting, St. Louis	18.00 to 18.50
Steel car axles, Birmingham	14.50
Steel car axles, St. Louis	21.00 to 22.00
Steel car axles, Chicago	22.25 to 22.75

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama canal	61.9 cents

Boiler plate, cut, No. 1, Chgo.	12.00 to 12.50
Boiler plate, cut, No. 1, St. L.	9.50 to 10.00
Boiler punchings, Chicago	14.00 to 14.50
Busheling, No. 1, Chicago	13.50 to 14.00
Busheling, No. 1, Cleveland	14.00 to 14.50
Busheling, No. 1, Cincinnati	10.75 to 11.25
Busheling, No. 1, St. Louis	11.50 to 12.00
Busheling, No. 2, Chicago	9.75 to 10.25
Bundled sheet, Cincinnati	8.75 to 9.25
Cast, No. 1, Cleveland	13.75 to 14.25
Cast, No. 1, Cincinnati	11.75 to 12.25
Cast, No. 1, St. Louis	13.00 to 13.50
Cast, No. 1, Chicago	13.50 to 14.00
Cast borings, Chicago	7.50 to 8.00
Cast borings, Cleveland	8.75 to 9.00
Cast borings, Cincinnati	7.75 to 8.25
Cast borings, St. Louis	7.00 to 7.50
Machine shop turnings, Chgo.	8.00 to 8.50
Machine shop turnings, Clevel'd.	8.75 to 9.00
Machine shop turnings, Cinci.	7.25 to 7.75
Machine shop turnings, St. L.	7.50 to 8.00
Malleable agricultural, Chgo.	12.00 to 12.50
Malleable agricultural, St. Louis	12.50 to 13.00
Malleable railroad, Chicago	13.50 to 14.00
Malleable, Cincinnati	8.75 to 9.25
Malleable railroad, St. Louis	12.50 to 13.00
Pipes and flues, Cleve'd (nom.)	13.00 to 13.75
Pipes and flues, Chicago	12.25 to 12.50
Pipes and flues, St. Louis	10.50 to 11.00
Stove plate, Chicago	11.50 to 12.00
Stove plate, Cleveland	10.25 to 10.75
Stove plate, Buffalo	11.00 to 11.50
Stove plate, Cincinnati	8.50 to 9.00
Stove plate, St. Louis	10.00 to 10.50

(Gross tons.)

Boiler plate sheared, Buffalo	13.00 to 13.50
Busheling, No. 1, Buffalo	13.50 to 14.00
Busheling, No. 1, Pbgh	15.00 to 15.50
Busheling, No. 2, Buffalo	11.00 to 11.50
Bundled sheet, Pittsburgh	15.00 to 15.25
Bundled sheet, Cleveland	12.75 to 13.25
Bundeld sheet, Buffalo	12.00 to 12.50
Car wheels (iron), Pittsburgh	16.00
Car wheels (steel), Pittsburgh	18.00 to 18.50
Car wheels, Chicago	14.25 to 15.00
Car wheels, eastern Pa.	16.00 to 16.50
Car wheels, Buffalo	15.25 to 15.75
Car wheels, N. Y.	14.00 to 14.50
Car wheels, St. Louis	13.50 to 14.00
Cast borings, New York	8.50 to 8.75
Cast borings, eastern Pa.	11.00 to 11.50
Cast borings, Buffalo	9.25 to 9.75
Cast borings, Pittsburgh	11.50
Cast, No. 1, eastern Pa.	17.50 to 18.00
Cast, No. 1, Pittsburgh	16.50
Cast, heavy No. 1, N. J. points	17.00 to 17.50
Forge No. 1, eastern Pa.	14.50 to 15.00
Frogs, switches, guards, Chgo.	16.50 to 17.00
Frogs, switches, guards, St. L.	15.75 to 16.25
Grate bars, Buffalo	11.00 to 11.50
Grate bars, N. J. points	13.25 to 13.50
Heavy axle turnings, Buffalo	12.00 to 12.50
Heavy melting steel, Pbgh	18.50 to 19.00
Heavy melting steel, Buffalo	16.50 to 17.00
Heavy melting steel, Chicago	16.50 to 17.25
Heavy melting steel, Cleveland	17.00 to 17.25
Heavy melting steel, Cincinnati	14.25 to 14.75
Heavy melting steel, eastern Pa.	17.00 to 17.50
Heavy melting steel, New York	14.50 to 15.50
Heavy melting steel, St. Louis	16.00 to 16.50
Iron rails, Chicago	18.00 to 18.50
Iron rails, Buffalo	17.00 to 17.50
Iron rails, Cincinnati	14.50 to 15.00
Iron rails, St. Louis	17.00 to 17.50
Iron rails, Cleveland (nom.)	17.00 to 18.00
Iron axles, Pittsburgh	26.00 to 27.00
Iron axles, Cincinnati	20.75 to 21.25
Iron axles, eastern Pa.	26.00 to 27.00
Iron axles, Chgo.	23.50 to 24.00
Iron axles, St. Louis	20.00 to 21.00
Iron axles, Buffalo	23.00 to 23.50
Low phos. steel, Buffalo	20.50 to 21.00
Low phosphorus steel, Pbgh	21.50
Low phos. steel, eastern Pa.	22.00 to 23.00
Machine shop turnings, Buffalo	7.75 to 8.25
Mch. shop turnings, New York	7.75 to 8.00
Mch. shop turnings, Pbgh	10.00 to 10.50
Mch. shop turnings, eastern Pa.	10.00 to 10.50
Mall. railroad, Cleveland	16.25 to 16.50
Malleable railroad, Buffalo	15.25 to 15.75
Malleable railroad, Pittsburgh	16.25 to 16.50
Malleable railroad, eastern Pa.	14.50 to 15.00
R. R. and mch. cast, No. 1 Bfl.	15.50 to 16.00
R. R. wrought, No. 1, Buffalo	17.50 to 18.00
Railroad wrought, No. 1, E. Pa.	21.00 to 22.00
R. R. wrgt., No. 1, New York	20.00 to 20.50
Railroad wrought, No. 1, Pbgh	19.00 to 19.50
Reroll. rails, 5 ft. & ov., Pbgh	18.25 to 18.50
Reroll. rails, 5 ft. & ov., Chgo.	18.00 to 18.25
Reroll. rails, 5 ft. & ov., Cleve.	16.25 to 16.75
Reroll. rails, 5 ft. & ov., E. Pa.	19.00 to 20.00
Reroll. rails, 5 ft. & ov., St. L.	17.50 to 18.00
Shafting, New York	19.50 to 20.00
Shafting, eastern Pa.	22.00 to 22.50
Shoveling steel, Chicago	16.50 to 17.00
Shoveling steel, St. Louis	14.00 to 14.50
Steel rails, short, Chicago	17.00 to 17.50
Steel rails, short, Cleveland	18.25 to 18.50
Steel rails, short, St. Louis	16.00 to 16.50
Steel car axles, New York	22.00 to 23.00
Steel car axles, Buffalo	23.00 to 23.50
Steel car axles, Cleveland	25.00 to 25.50
Steel car axles, Pittsburgh	25.00 to 26.00
Steel car axles, eastern Pa.	24.00 to 25.00
Stove plate, N. J. points	13.25 to 13.50
Stove plate, Pittsburgh	12.00 to 12.25
Stove plate, eastern Pa.	13.25 to 13.50
Wrought pipe, New York	12.75 to 13.00
Wrought pipe, eastern Pa.	14.75 to 15.25

Opportunities

POSITIONS OFFERED
Minimum ad. set solid, 50 words $1.00
Minimum ad. all caps, 50 words $1.50

POSITIONS WANTED
Minimum ad. set solid, 25 words $.50
Minimum ad. all caps, 25 words $.75

(Each additional word set solid, 2c.—Each additional word all caps, 3c.)

Positions Offered

WANTED AT ONCE, SEVERAL FIRST class draftsmen of general mill and blast furnace experience. State age, experience, present salary and salary wanted in first letter; also when available. Central location Pittsburgh. Address Box 749, THE IRON TRADE REVIEW, Cleveland, O.

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UNDERSIGNED COUNSEL WILL CONfidentially negotiate preliminaries for important executive, technical, administrative and professional positions, insuring strictest privacy. Not an agency, but a highly-endorsed, high grade method of negotiating preliminaries only, for $2,000 to $12,000 men. Send address only for explanation. R. W. Bixby, F1 Niagara Square, Buffalo, N. Y.

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WANTED BY ORDNANCE PLANT. Must be conversant with modern methods and equipment; also capable of operating under forced draft. Give full particulars as to experience, previous employment, age and salary expected. Applications will be treated in confidence. Address Manager, Box 176, Newark, N. J.

Positions Offered

CHEMISTS WANTED BY A LARGE steel manufacturer, must be experienced in analysis of iron, steel, ores, limestones, slags, etc. Apply stating age, training, experience and salary expected. Address Box 824, THE IRON TRADE REVIEW, Cleveland, O.

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